

# ***Southern Power & Industry***

The Industrial and Power Journal of the South and Southwest

A W. R. C. Smith Publication

NOVEMBER, 1961

University Microfilms  
313 N First St  
Ann Arbor Mich 4



Exhaust hose at right is collecting beryllium—toxic and worth \$100 a pound ..... See page 30

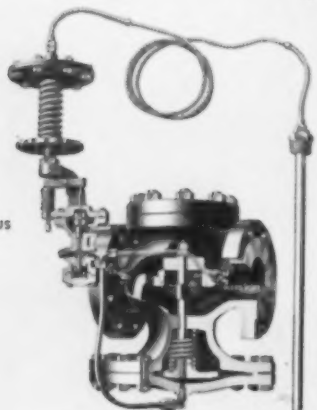
**WATER! The Heat Is On -- Read Page 28**

## VALVE TIPS:

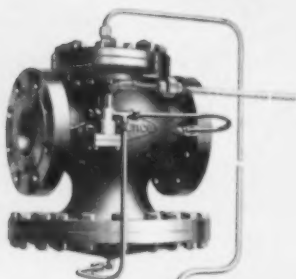
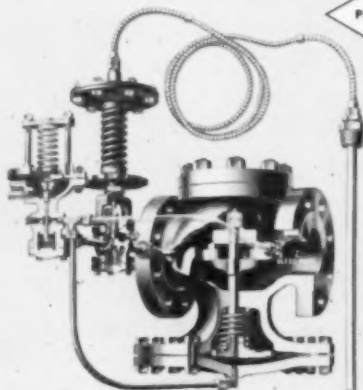
# How to Select Automatic Regulating Valves For Temperature Control

THE  
MOST  
COMPLETE LINE OF  
PRESSURE AND TEMPERATURE  
REGULATORS  
IN THE  
WORLD

1. Instantaneous  
Heaters  
Spence  
ET124  
Series

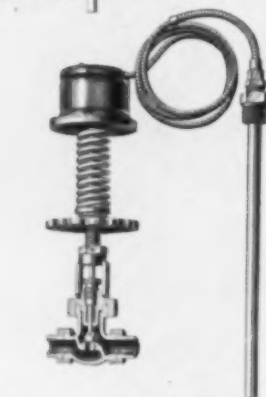
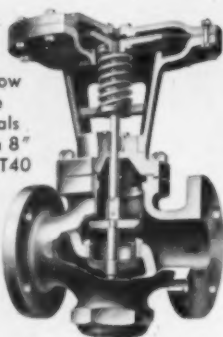


2. Storage  
Heaters  
Spence  
ET14D



3. Air Control  
Systems  
Spence  
EAT Series

4. Very Low  
Pressure  
Differentials  
2" Through 8"  
Spence G2T40



5. Very Low Pressure Differentials  
Up Through 2" Valves  
Spence Direct Acting T2

During the past year, our field representatives have reported many cases of improperly, and uneconomically, applied temperature regulators. To help you avoid some of these costly mistakes, here are a few tips on selecting the most effective and economical temperature regulating valves for your applications.

1. Instantaneous heaters require a special action for close temperature control and freedom from hunting. In the Spence ET124 series, steam pressure is modulated according to temperature (demand) and is automatically regulated at any pressure established by the demand.
2. Storage heaters, on the other hand, are more economically controlled by the Spence ET14D, which in-

cludes a simple temperature-actuated pilot that opens and closes the main valve to maintain a constant temperature.

3. Air control systems can now have a  $\pm 5^\circ\text{F}$  control accuracy under wide and instantaneous load swings with the Spence EAT regulator. Engineers report savings of up to 50% in installed costs with this recently developed Spence cascade system when it has been used in place of conventional instrumentation.
4. For the combination of very low pressure differentials and air or water control, Spence recommends Type G2T40. This single seated pilot operated valve provides fast, positive response in 2" through 8" valves. Double seat Type G22 is also available in 10" through 12".

5. When very low pressure differential is encountered with valves of 2" or less, the Spence direct operated T2 is recommended. The sensitive vapor tension thermostat responds quickly to small changes in bulb temperature for continuous, accurate control.

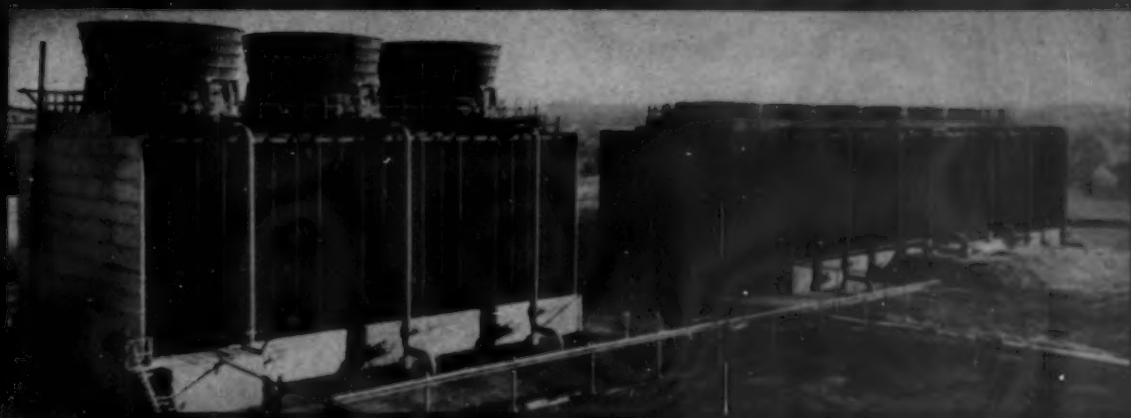
In this brief description of industrial process and heating temperature control, we have given a few important tips in proper regulator selection. If you would like more detailed information on these control applications, write for the new Spence Temperature Control Bulletin IV 1014.

SE-150

SPENCE ENGINEERING COMPANY, INC.,  
Walden 1, N. Y.

Paulsen Spence, P. E., President

*again and again and again...*



Cooling System No. 2 at Iowa Southern Utilities Company's Bridgeport Station circulates 19,000 gpm and includes this Tower. Inlet temperatures range from 83 to 90°F; outlet temperatures 70 to 75°F. To this System, Dearborn 860 with Endcor B was fed for comparative tests with System No. 1 in which prior treatment was continued. Corrosion testers installed in by-pass lines of the return water riser in each Tower gave comparative results—serious localized or pitting type corrosion at a rate averaging 10 to 12 mils per year in System No. 1; complete absence of pitting and a corrosion rate of only 1.2 mils in System No. 2 using 860 with Endcor B.

## **Endcor® proves its superiority in cooling water treatment**

Whether it's Endcor A combined in polychromate formulations or Endcor B in non-toxic dimetallic polyphosphates, these organic additives—developed in Dearborn's research laboratories—continue to prove their superiority *in actual plant operation everywhere.*

For example, at Iowa Southern Utilities' modern 66,000 KW Bridgeport generating station (Eddyville, Iowa) Dearborn® 860 with Endcor B *completely eliminated* pitting and reduced the corrosion rate from 12 to 1.2 mils per year. It also produced a significant reduction in the reversion rate of polyphosphates as compared with the previous sodium hexametaphosphate and tannin treatment. Results: First, economy, since more polyphosphate is available per unit fed; second, improved performance, because of less insoluble phosphates to deposit in heat exchangers.

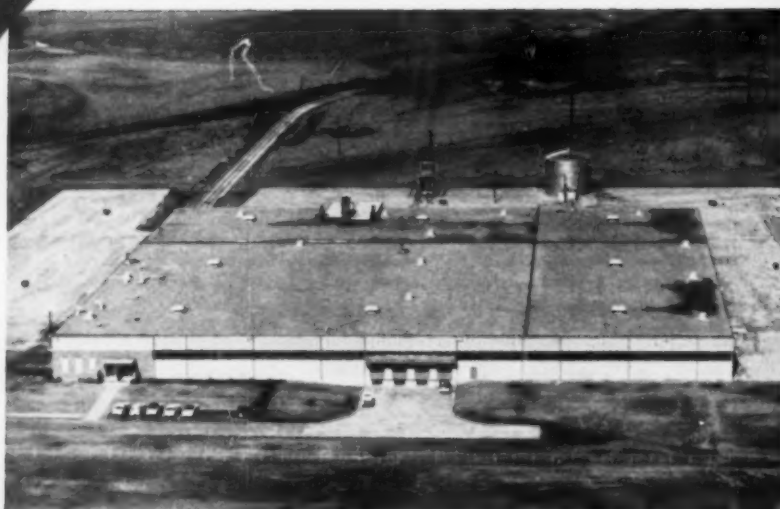
But there's more involved in Dearborn service than just product superiority. There's the important "plus" of Dearborn's water treatment experience—from source to re-use—dating back to 1887—longest in the field. There's its extensive research and analytical facilities...its Technical Centers in Chicago and Toronto, staffed with recognized experts to analyze and solve specific problems . . . to make certain that Dearborn products and equipment give top performance always.

It always pays to check with Dearborn. Consult your nearest Dearborn representative, without cost or obligation. Or write for Technical Bulletins on Endcor products now available.



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COPPER AND ALUMINUM WIRE AND CABLE





# Southern Power & Industry

The Industrial and Power Journal of the South and Southwest

Eugene W. O'Brien  
Managing Director

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NOVEMBER, 1961

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# the SOUTH—SOUTHWEST

*more power . . . more plants . . . more money*

## The Southern Company Plans Major Expansion

A tremendous expansion in the electric transmission facilities comprising **The Southern Company's** integrated system is scheduled to take place during the next decade. The system includes Alabama, Georgia, Gulf and Mississippi power companies and Southern Electric Generating Company.

The four-state operating area is served by a network of 17,000 circuit miles of high voltage lines, including 900 miles of 230,000-volt lines. In 1970, according to present plans, the system will have approximately 3,000 miles of 230,000-volt lines, or more than three times the present figure.

All of the major electric systems in the Southeast are interconnected in a vast power grid. The Southern group, occupying a central position in this network, now has 16 interconnections, with neighboring utilities in North and South Carolina, Florida, Tennessee and Louisiana, operating at 100,000 to 161,000 volts. By 1970, five interconnections of 230,000 volts are expected to be in service.

At the end of 1960 the Southern system's investment in transmission facilities was approximately \$305,000,000. By 1970 this figure should substantially exceed \$600,000,000, as new, higher voltage lines are built to provide the movement of larger and larger blocks of power.

The Southern generating and

transmission facilities have been operated for many years as a completely integrated power pool with a central power coordination office in Birmingham.

## Westinghouse Expedites Texas Utility Equipment

**Westinghouse Electric Corporation** manufactured and delivered more than a million dollars worth of major electrical equipment for a power plant extension that was built at Brownsville, Texas, in a record-breaking seven months. The Si Ray Extension of the Brownsville Municipal Utilities was dedicated Sept. 12.

In December, 1960, an order was placed for a 22,000 kilowatt steam turbine generator unit for the plant, which was in operation by June 1961, to meet peak loads during the summer.

Brown and Root, Inc., of Houston, Tex., was contractor for the plant. Westinghouse also supplied motors, control equipment, switchgear, power transformers, circuit breakers, substation structures and miscellaneous meter and relay equipment.

## Gas Turbine—Greenwood, Miss.

The first **General Electric** gas turbine package power plant to be installed in Mississippi for electric power generation has been purchased by the **Greenwood Utilities**. Inspecting a similar 11,250-kilowatt powermaker at G-E's Gas Turbine Department in Schenectady, N. Y., are, left to right, J. S. Gills, G-E sales engineer from Alexandria, La.; C. M. Mathews, Manager, and A. Paul Phillips, plant superintendent, of Greenwood Utilities, and Robert K. LeRoy, Gas Turbine sales engineer.

Burns and McDonnell Engineering Company of Kansas City, Mo., are acting as consultants to Greenwood Utilities in this installation.



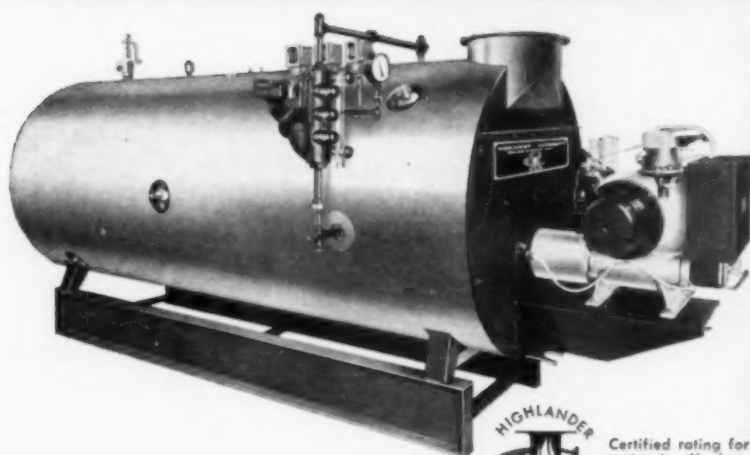
## Daniel Awarded Chemstrand Contract

Daniel Construction Company, Greenville, South Carolina, has been awarded a contract for construction of the new Chemstrand Management Information Center to be built at McAlister Plaza, Greenville.

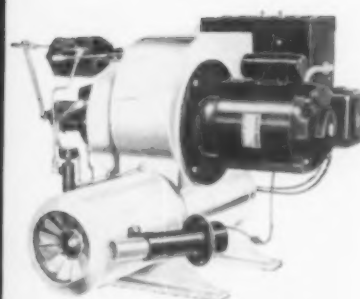
The Management Information Center, now located in temporary quarters in the former Tull Building, is an important factor in The Chemstrand Corporation's expanded program of customer service. Improvements are planned in production and marketing coordination, and in order handling and distribution of products to customers. Staff personnel representing these functions will make use of the output of the latest types of electronic computer equipment in carrying out these activities.



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No boiler can operate with high efficiency without a top-quality burner to fire it. That's why the nation's foremost engineers, contractors and architects choose the reliable HEV-E-DUTY Burner for use in important industrial, commercial and institutional buildings.

Built to get maximum economy from heavy oils or low-cost gas, HEV-E-DUTY BURNERS are completely assembled, wired, tested and fired at the factory. Installation is quick and easy. You get service-free, reliable performance day after day.

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The HEV-E-OIL Burner engineered to use inexpensive No. 4, 5 and 6 heavy oils is shown here. Available from 5 to 150 gph. HEV-E-DUTY Power Gas Burners and Combination gas/oil Burners from 720,000 to 21,000,000 BTU's.

Install HEV-E-DUTY BURNERS where ever quality and dependability are essential. Replace your existing burner, or better still — install one single unit — the Highlander Boiler-Burner Unit — the ultimate in efficient operation for power, processing or heating.



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# HOW TO PRESERVE YOUR FENCES



## Lock Out Corrosion

### Step No. 1

Protect new galvanized fences as soon as they are erected. Minimize rust stains; preserve newness. It's simple and inexpensive: Use GALVANOX, cold-applied galvanizing, to touch up spots where original galvanizing has been damaged during erection.

GALVANOX is delivered in the form of a ready-mixed paint and applied with an ordinary paint brush — dries in 20 minutes and becomes thoroughly hard overnight. Being 95% pure metallic zinc and electrically conductive, the zinc acts as a sacrificial anode and the steel as the cathode, thereby establishing a galvanic cell very similar to the hot-dip galvanizing itself.

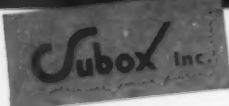
### Step No. 2

When the fence has weathered to the point where the galvanizing has worn thin and shows rust staining, then apply a single coat of

SUBALOX #508 GUN METAL. It matches the appearance of the weathered galvanizing and maintains a uniform appearance for both old and new sections. Other colors are also available, if color change is desired.

SUBALOX contains the unique, chemically-active pigment, suboxide of lead. It is highly rust-inhibitive, hard and yet truly flexible. It clings to the small, round surfaces of wire mesh, penetrates where the wire overlaps, and provides protection for an average of 5 to 8 years per single coat. No other surface pretreatment, primers or finishers are required. And SUBALOX PAINT works so easily it can be used by brush, spray, roller or even floor broom to provide good jobs. Planned fence maintenance keeps good appearance, preserves investment, reduces costs. Further details sent gladly on request.

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## Southern News Briefs (Continued)

### G-E Equipment for Gulf States Utilities

Gulf States Utilities Company, Beaumont, Tex., will be among the first utilities to use General Electric's new digital telemetering equipment. Installation of the system will be completed by the end of 1961.

Considerable savings in time and money are expected through this automatic and highly accurate transmission of data. At the same time, human error is eliminated, since no further refinement of data is required, according to G-E engineers.

The Gulf States Utilities Company equipment will transmit kilowatt-hours in and out information from six remote inter-connections into a central dispatching office upon command of remote demand meter clocks. Information will be logged by location on an electric typewriter, showing exact time of reading and total kilowatt-hours in and out.

### A-C Southern Appointments

Appointment of Henry M. Brundage as manager of the Chattanooga district has been announced by Allis-Chalmers Industries Group. Mr. Brundage has been a sales representative in the Chattanooga district since 1956. He succeeds J. Warren Roberts, who has been transferred to the Southeast region office in Atlanta as regional representative for electrical transmission and distribution equipment.

Appointment of Joseph Bronaugh as manager, utility sales, Baltimore district, has also been announced by Allis-Chalmers Industries Group. Mr. Bronaugh joined the company in 1929. He was successively a sales representative in the Richmond and Norfolk offices before being named manager at Miami in 1946, and later was manager of the Cleveland district.

Named to new A-C Charlotte District posts are Andrew Wassell as manager, utility sales, and W. W. Chalmers, manager, industrial sales.

Mr. Wassell has been a sales representative in the Charlotte district since 1953. Mr. Chalmers, a sales representative in the Charlotte district for the last year, was a sales representative in the Birmingham district for several years.



**GENERAL**

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## **FUTURE EVENTS of Engineering Interest**

**Nov. 26-Dec. 1: ASME Winter Annual Meeting**, Statler Hilton Hotel, New York. The American Society of Mechanical Engineers, 345 E. 47th St., New York 17, N. Y.

**Nov. 27-Dec. 1: 28th Exposition of Chemical Industries**, New York Coliseum. E. K. Stevens, International Exposition Co., 480 Lexington Ave., New York 17, N. Y.

**Nov. 27-Dec. 1: Regional Conference, Southeast Region, NACE**, Key Biscayne Hotel, Miami, Fla. T. J. Hull, Exec. Sec'y, NACE, Houston.

**Jan. 22-25, 1962: Plant Engineering & Maintenance Show & Conference**, Convention Hall, Philadelphia. Clapp & Poliak, Inc., 341 Madison Ave., New York 17.

**Jan. 29-Feb. 2, 1962: AIEE Winter General Meeting & Electrical Engineering Exposition**, New York Coliseum. Reber-Friel Co., Mgr., 117 S. 17th St., Philadelphia 3, Pa.

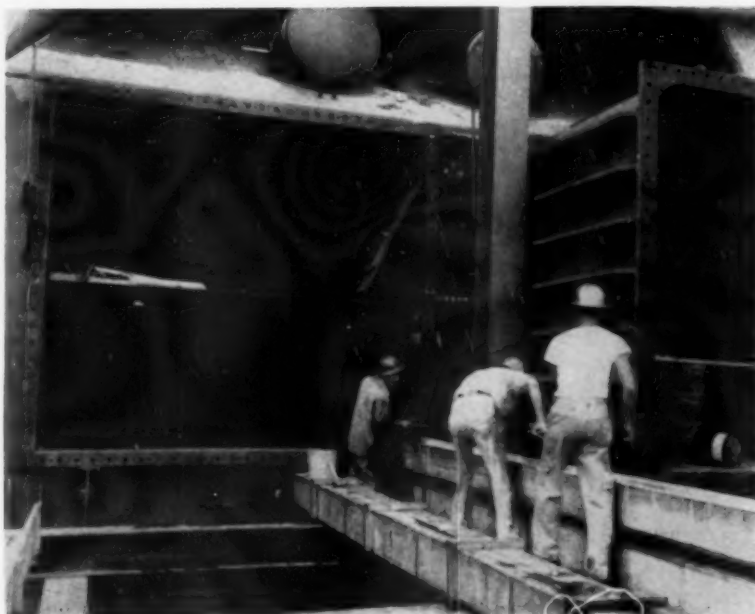
**March 4-8, 1962: ASME Gas Turbine-Process Industries Conference & Products Show**, Shamrock Hilton Hotel, Houston, Texas. Sec'y, ASME, 345 East 47th St., New York 17, N. Y.

**May 7-8, 1962: ASME Maintenance & Plant Engineering Conference**, Royal Orleans Hotel, New Orleans, La. Sec'y, ASME, 345 East 47th St., New York 17, N. Y.

## **Engineering Societies Move**

Nineteen engineering organizations have moved into the new 20-story, \$12 million **United Engineering Center** on United Nations Plaza, between 47th and 48th streets, New York. The Center is owned and operated by United Engineering Trustees, Inc.

The Center is the largest concentration of professional engineering societies in the Free World. Occupants include the five "Founder Societies" — the American Society of Civil Engineers; the American Institute of Mining, Metallurgical, and Petroleum Engineers; the American Society of Mechanical Engineers; the American Institute of Electrical Engineers; and the American Institute of Chemical Engineers.



## **Tapered Tubes for Florida Power & Light**

Tapered tubes, recently developed by **Chase Brass & Copper Co.**, are shown being installed in the new condenser unit at **Florida Power & Light Company's** Riviera Plant. The installation is part of a 600,000 kw extension under construction by the utility. The heavy end, tapered condenser tubes are designed to combat inlet and erosion, a major cause of tube failure. Chase supplied 280,665 lb of aluminum brass tubes featuring this new design for the Florida installation. The photo shows the installation being made for the 300,000 kw Unit No. 3 condenser.

## **PLANT PERSONNEL**

**Robert S. Baker** has been appointed manager of General Electric Company's Computer Center at Huntsville, Alabama, which is operated at Redstone Arsenal under contract with the National Aeronautics and Space Administration. Mr. Baker was formerly manager of intermediate systems at the Computer Department headquarters in Phoenix.

**George K. Weir** is manager of utilities for the City of Brownsville, Texas, where a power plant extension was recently completed.

Newly appointed coordinator of engineering for American Air Filter Company's Reed Division at Louisville, Kentucky, is **Don J. Gonzalez**. **Richard D. Rivers** has been appointed manager of research, and **Karl L. Westlin** is manager of product engineering. **Robert F. Logsdon**, formerly assistant chief engineer for the division, has been appointed manager of

engineering. . . **Charles D. Wright** has been named Southern regional manager of the Air Filter Division and will have headquarters in Atlanta.

## **Continental Conveyor Receives TVA Contract**

Contract to furnish belt-conveyor equipment for a huge coal-handling system for the Tennessee Valley Authority's new steam generating plant at Paradise, Kentucky, has been awarded to **Continental Conveyor and Equipment Company**, Winfield, Alabama. Although actual bid price was not revealed, the amount is said to be over a million dollars.

Continental Conveyor and Equipment Company is successor to the Industrial Division of Continental Gin Company, Birmingham, and has operated as a separate corporation since late 1959.

*(Continued on page 64)*



**AT 3 A.M. ON SUNDAY**  
**OUR CUSTOMER HAD TO HAVE**  
**A BEARING . . .**  
**HE GOT IT FROM 100 MILES AWAY**  
**IN LESS THAN 5 HOURS!**

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Our man checked his branch and found that this was a special bearing which his records showed was in stock at another branch 100 miles away. A call to this branch manager at 4:30 a.m. alerted him to meet a chartered plane at a nearby airport at 6:30 a.m.

We delivered the bearing to our customer at 8:30 a.m. A total elapsed time of less than five hours on a Sunday morning . . .

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Knoxville • Memphis • Nashville • VIRGINIA: Norfolk • Richmond • Roanoke



# Facts and Trends

For more information on any of the following items—  
Write the editors of SOUTHERN POWER & INDUSTRY  
1760 Peachtree Road, N.W., Atlanta 9, Ga.

NOVEMBER, 1961

- ◆ **SECRET STEEL**—The Spartans of ancient history were legendary for their military prowess. The secret of their supremacy was steel weapons. At least that is the theory of Dr. Lyle B. Borst nuclear physicist on the faculty of New York University and a former member of the Manhattan District project which produced the first atomic bomb.

Steelways, official publication of American Iron and Steel Institute, said archeological studies and metallurgical tests lend credence to his theory that the Spartans' close-mouthed policy kept from the Athenians and all comers the secret of their supremacy from 700 to 400 B.C. Dr. Borst has found in ancient writing what he believes may actually be obscure descriptions of a sort of carburizing furnace in which the Spartans refined iron into steel.

- ◆ **FUELS FOR FURNACES**—What may well be the most important innovation in blast furnace operation since World War II is being tested by steelmakers to give the industry greater competitive strength in today's hotly contested markets.

Steelways, official publication of American Iron and Steel Institute, said steelmen believe they can operate their blast furnaces cheaper and better if either natural gas or fuel oil is added to conventional coke. Initial tests indicate that savings in coke could run as high as 25 per cent and production could be increased by as much as 14 per cent by the use of these supplementary fuels.

- ◆ **MIDDLE SOUTH**—The Middle South States of Arkansas, Louisiana, and Mississippi had 90 new plants announced in the first six months of 1961, reports from the three state development agencies reveal. In addition, plans were announced to expand 106 existing plants in the area.

New job opportunities available when the 90 new plants and 106 expanded plants are in production will approximate 11,190, with an annual payroll in excess of \$42 million.

- ◆ **BETTER POWER PLANNING**—The Virginia Electric and Power Company has announced plans between four neighboring electric utilities in the Carolinas and Virginias to coordinate and pool their power production transmission facilities. In addition to Vepco, the other companies are Carolina Power & Light, South Carolina Electric & Gas, and Duke Power Company. These are the same four companies that joined together in 1956 to build and develop the first atomic power station in the Southeast.

Vepco President, A. H. McDowell, Jr., said, "the basic pooling and coordination plan does not include the details for pooling capacity, coordinating transmission construction, or allocating the costs involved. However, it does designate the means of arriving at mutually agreeable plans and sets a time limit of

(Continued on Page 14)



## COAL FUELS THIS PUSH-BUTTON PACKAGED STEAM GENERATOR

This is good news for industry in those areas where coal is the most economical fuel. Never before were the inherent economic advantages of *packaged* water tube boilers available to industry without the penalty of using fuels other than coal. This held true even in coal-producing areas.

This is no longer the case. Thoroughly proven semi-automatic *coal-fired* packaged boilers are now offered by Foster Wheeler and are available in capacities from 40,000 to 63,000 lbs. of steam/hr. They are comparable with the most advanced gas- and oil-fired units obtainable.

In coal's prime market areas steam users should know of this opportunity for substantial and repeated savings in fuel costs. The FW coal-fired packaged boiler offers: the use of economical coal as fuel . . . and low first cost, operating and other economies inherent in the packaged boiler concept.

For more complete engineering performance and descriptive data on this new coal-fired packaged unit, request bulletin PG59-4. Foster Wheeler Corporation, 666 Fifth Avenue, New York 19, N.Y. *Heat Engineered* products, plants and processes . . . for the world's industrial progress.

**FOSTER**



**WHEELER**

NEW YORK

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MILAN

TOKYO

## Facts and Trends (Continued)

January 1, 1963 for this to be accomplished. Plans also contemplate joint long-range planning of new construction—both for generating capacity and for transmission lines.

- ◆ **NEW RUBBER**—A revolutionary new synthetic rubber, which will provide 35 per cent more tread mileage and eventually may nearly double tire life, is going into production at The Goodyear Tire & Rubber Company's new Beaumont, Texas plant.

"Budene" is a cis-polybutadiene rubber that can be substituted for natural or styrene-butadiene rubber (SBR) in varying amounts, according to the intended end use. As a supplementary material, it improves the overall physical properties of either natural or other types of synthetic rubber, it was explained. Blended with SBR in tire treads, specially compounded Budene improves wear by approximately one per cent for each per cent of the new rubber used in the blend. A 50/50 blend is considered most practical for use in existing production equipment.

- ◆ **ALUMINUM-VULCANIZED RUBBER**—Aluminum sheet and foil now can be permanently vulcanized onto rubber, yielding a material combining the surface toughness, corrosion resistance and insulative values of aluminum with the flexibility of rubber, the vice-president in charge of research for Reynolds Metals Company has announced.

The process is made possible by a special aluminum coating. Projected applications for the aluminum vulcanized rubber include aluminum tire cords for longer wear, flexible aluminum-covered pipe and tubing, tenting and tarpaulins. Reynolds applies the coating to the metal and ships it to customers in roll form. When the rubber is vulcanized, the aluminum becomes an integral part, as difficult to remove as the tread on an automobile tire.

- ◆ **SUBSIDIZING TRICHYLCULTURE**—According to a recent newspaper account, barbers from two towns in New Mexico have come up with a cure for both juvenile delinquency and unemployment.

The barbers' plan was disclosed in a petition to their senator: "We feel that cleanliness and neatness of appearance can help a man's morale and help cut down on delinquency which is rising due to our economic unrest. We feel it would be a big help to boys and the unemployed men if haircuts could be paid for . . . much the same as the school hot lunch system. . . . It will not only help these unfortunate people but the barbers and their families as well . . ."—Abstracted from the C of C Bulletin "Economic Intelligence."

- ◆ **GOOD COMMUNICATIONS** between buyers and suppliers are an absolute essential in the field of industrial distribution, observes Phillip A. Hall, Vice Chairman of the Research Committee of the National & Southern Industrial Distributors' Associations. Mr. Hall makes that observation in the course of an article on buyer-distributor relations to appear in regional purchasing publications.

How to communicate, Mr. Hall believes, depends to a great extent on the esteem in which the buyer holds salesmen, and vice versa. "Distributors resent, as much as the buyer, the salesman who indulges too long in idle chit-chat, or who calls with nothing in mind but the minimum order. Good industrial distributors' salesmen are marketing counselors. They are kept constantly

(Continued on Page 21)



*Compact Packaged Air Preheater being unloaded for installation on new 100,000 lb/hr boiler at Hoffmann-La Roche's Nutley, N. J. headquarters. In operation, it will increase the temperature of the combustion air 375°F—thereby increasing boiler efficiency by approximately 8%.*



## **PACKAGED AIR PREHEATER**

**WILL RECOVER 330°F FROM NEW BOILER  
FOR HOFFMANN-LA ROCHE INCORPORATED**

Hoffmann-La Roche, one of the leading producers of pharmaceuticals, vitamins and aromatic chemicals, specified a Ljungstrom Packaged Air Preheater for their new boiler for three reasons: 1) This compact, preassembled unit is ready to run as soon as it's connected to the power line and ducts—no extra installation or erection costs; 2) The unit occupies only about 450 cubic feet of space but will cut boiler exhaust temperatures from 680°F to 330°F—for about 8% saving in fuel; 3) Savings in fuel alone—roughly 1% for every 40°F drop in exit gas temperature—can pay for the unit in two short years!

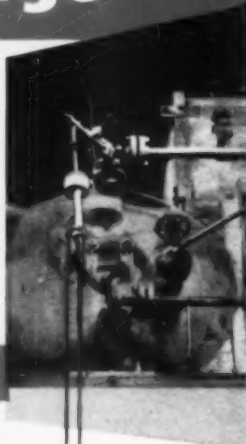
Packaged Ljungstroms are available in sizes for use on boilers in the 25,000 to 250,000 lb/hr range—can give you these same fuel saving advantages. For full information, write today for our 14-page Packaged Air Preheater booklet.

**THE AIR PREHEATER  
CORPORATION**

80 East 42nd Street, New York 17, N. Y.

## Why a remote reading gage

- Most boiler drums are high — direct gages are far from operating floor.
- Obstructions often make gages hard to see — necessitate special equipment or frequent climbing to inspect.
- Remote gage saves thousands of steps, hours of valuable time. Brings gage reading *down to eye level* at safe distance from boilers.

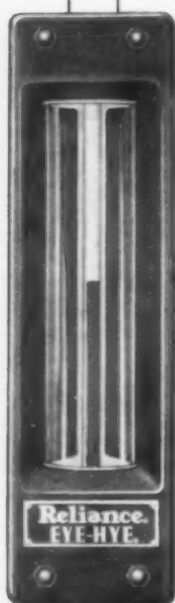


## Why Reliance EYE-HYE

- EYE-HYE assures perfect measurement, dependability and clear reading.
- All-hydrostatic principle — no mechanical parts — no adjustments on location.
- Reads in liquid, like a conventional gage, but easier, faster because of illuminated green indicating fluid.
- Oldest practical remote gage — over 13,000 in use — on land and sea.
- Economical special attachment actuates supplementary alarms, audible or visible, if desired.

- Available for either wall or panel mounting, new wide-visibility EYE-HYEs are made for any pressure range — up to 3000 psi. Also long window model for unusual liquid level variation — for tanks, heaters, etc.

Write for catalog information on EYE-HYE for *your* boiler pressure.



The Reliance Gauge Column Co., 5902 Carnegie Ave., Cleveland 3, Ohio

# Reliance

BOILER SAFETY  
DEVICES

## Coming in December **THERMAL INSULATION**

*Reference Guide  
and  
Buyer's Directory  
for the  
South-Southwest*

### NEW PRODUCTS & BULLETINS

—asbestos, cork, felt, glass, wool, magnesia, mica, silica — fills, sheets, cements, blankets — for tanks, boilers, evaporators, piping, processing equipment, etc.

**SALES ENGINEERS** serving you in the Industrial South-Southwest — Directory type listings, including name, address, and phone numbers.

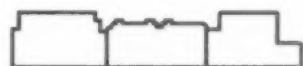
This is SPI's annual technical service aid in the **THERMAL INSULATION** field for 1961.

This edition will be a real service to you and to 17,500 other Consulting - Engineering - Operating - Maintenance personnel in over 12,300 Southern & Southwestern industrial plants (manufacturing, process, utility and service).



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***Available January 1, 1962:  
All-inclusive  
Turbine-Generator  
Service Contract  
from Westinghouse***



# ***Let Westinghouse service your***



---

***You can save all these ways when you have a Westinghouse Turbine-Generator Service Contract:***

- ***Fuel costs may be minimized.***
- ***Unscheduled outages may be reduced.***
- ***Trained crews cut outage time during overhaul.***
- ***Planning techniques cut overhaul time by pre-shutdown ordering of necessary parts.***

***Here's what Westinghouse Turbine-Generator Service Contract gives you...***

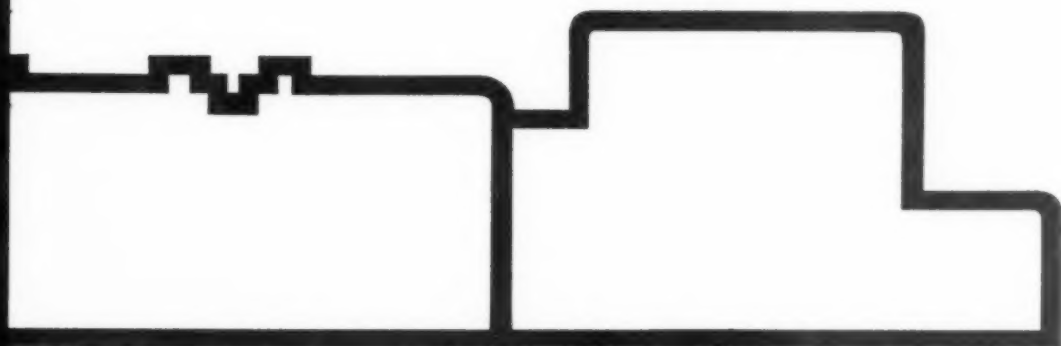
***As soon as you approve the contract, Westinghouse as-***

***signs an engineer to your turbine-generator. As a consulting specialist in turbines and generators, he'll call at quarterly, semi-annual or annual intervals, whatever your contract provides. He'll check your operating records, inspect your turbine-generator equipment, and advise plant personnel on any operating problems. Finally, he'll submit a detailed report of observations, conclusions and recommendations.***

***The Westinghouse Turbine-Generator Service Contract is not intended to provide routine***



## ***turbine-generator... and save***



***maintenance. The service complements the activities of your regular maintenance department on a scheduled basis.***

***At regular intervals, you'll receive a confidential TGSC Service Bulletin from Westinghouse. This bulletin contains reports of operational and maintenance experience of other turbine-generator users. It lets you profit by their experience.***

***Your contract is flexible and can be tailored to your individual requirements. For example, major inspection and overhaul***

***is provided for in your original contract, based on a detailed outline of all work to be performed. Or your contract can be written to provide for specific work as required.***

***You determine your needs—Westinghouse does the work.***



## Turbine-Generator Service Contract

### ***A typical schedule of inspection by a Westinghouse turbine-generator specialist will include:***

Periodic visits to the plant location for a complete review of historic and present operational data, plus consultation on present operational procedures as related to current needs.

1. Discuss with operating people the past performance and history of the turbine-generator, noting any malfunctions.
2. Check in detail governor operation and overall performance.
3. Check any record of spindle movement for possible wear of component parts.
4. Look for abnormal symptoms.
5. Detect unusual operational conditions and make definite recommendations to remedy them.
6. Discuss with and advise personnel on the most efficient and economical operation for the turbine-generator under current operating conditions. This keeps new personnel up to date on proper operating methods for the particular machine.
7. Recommend new operating methods and procedures as required.
8. When an outage is necessary, the Westinghouse engineer will assist in planning the work schedule.
9. Make a detailed written report of observations, conclusions and recommendations.

### ***A typical full-scale turbine-generator inspection by Westinghouse will include:***

1. Removal of insulation, cylinder covers, blade rings, gland seal rings, spindles, and other components requiring inspection and cleaning.
2. Inspection and cleaning of all blading, seal strips, bearings, main oil pump, governor pump and thrust pedestal seals.
3. Cleaning of spindle and stationary blading where necessary.
4. Inspection and cleaning of control system.
5. Inspection and cleaning of steam chest valves, intercept valves, reheat stop valves and throttle valves.
6. Magnaflux or zygo examination of spindle, rotating and stationary blading as determined necessary.
7. Inspection and adjustment of turbine-generator supervisory instruments.
8. Inspection and testing of exciter, bearing brackets, generator rotor, bearings and hydrogen seal rings.
9. Visual inspection and dielectric absorption, voltage leakage and slot discharge tests of all stator parts and windings.
10. Testing of insulation resistance on rotor, exciter and other parts.
11. Varnishing of windings as required.
12. In this type of contract, the Westinghouse engineer will plan for the work, schedule the turbine-generator crew and follow the work to completion. No need to borrow work crews from other plants to carry out the inspection and overhaul. Westinghouse does the whole job when you have a Turbine-Generator Service Contract.

The Turbine-Generator Service Contract is available in the Westinghouse Southeastern Region. For complete details, contact your Westinghouse sales representative—or write to Westinghouse Electric Corporation, P.O. Box 4808, Atlanta 2, Georgia.

*You can be sure . . . if it's Westinghouse*



**Westinghouse**

## Facts and Trends (Continued)

informed about new and improved products, about availability and delivery, about impending price changes, about order followup, about new selling techniques—about everything and anything that will help them to serve industrial buyers more effectively.

- ◆ **AMMONIA FOR FUEL CELL**—Research scientists at Allis-Chalmers are now using ammonia as a fuel in the company's continuing fuel cell development program, according to a report presented by the company at the recent annual meeting of the American Chemical Society in Chicago.

In the laboratory-sized ammonia fuel cell, the electrodes are commercially available porous carbon. A catalyst of platinum black applied to the electrodes aids the reaction. An electrolyte of concentrated potassium hydroxide is held in a porous diaphragm between the electrodes. Ammonia is fed to the anode side of the cell and oxygen to the cathode side. The resulting chemical reactions cause an electric current to flow between the electrodes in an external circuit. The principal products of the reaction are nitrogen and water.

- ◆ **URANIUM**—Nuclear power generation could by 1975 require as much or more uranium ore than current annual production, according to Dr. Lyman Fink, a General Electric atomic executive. Although only a small percentage of uranium production now goes for fuel for nuclear power plants, the potential commercial market could be as great or greater than presently exists for weapons requirements.

Less than five per cent of the domestic uranium production is used in electric power production. Dr. Fink said that a 15 per cent (one mil per kilowatt-hour) cut in the cost of atomic-electric power in the next few years could mean the difference between 10 million and 30 million kilowatts of installed nuclear generating capacity by 1975. Nuclear fuel currently represents about 25-30 per cent of the cost of atomic-electric power.

- ◆ **ATOMIC BATTERY**—The world's first "atomic battery" to be used in a space satellite continues to operate successfully after 10 weeks of orbiting the earth. The experimental nuclear device is generating electricity for two of the four navigational transmitters of the Transit IV-A satellite launched June 29.

The device is a tiny, lightweight thermoelectric generator fueled with plutonium 238. It generates 2.7 watts of electrical power, weighs 4.6 pounds, and is capable of powering a space transmitter for decades. The spontaneous decay of the plutonium 238 generates heat and thermocouples convert this heat directly into useful electrical energy. The generator has no moving parts.

- ◆ **TWO-CYCLE ENGINE**—A new DKW engine with a revolutionary automatic oil injection lubrication system has been announced by Mercedes-Benz Sales, Inc., distributor for Mercedes-Benz and Auto Union-DKW cars in the U.S. The ratio of oil to gas is now greatly reduced from 40-to-one to 100-to-one for normal driving.

The immediate advantage claimed for the new DKW engine is that it now offers the convenience of four-cycle engines with the proved advantages of the two-cycle power plants. Offensive "smoking" common to conventional two-cycle automobiles is claimed to be completely eliminated with the development of the new metered oil injection system.

(Continued on Page 22)

## Facts and Trends (Continued)

- ◆ **STIFFER LEGISLATION**—There is "no sound reason" for stiffer pension-welfare fund reporting legislation, the Chamber of Commerce of the United States said in a leaflet released recently. "There have been no evils shown that call for it." Views of the National Chamber on pending legislation backed by the Kennedy Administration were expressed in a six-page leaflet, Protecting Employee Welfare and Pension Funds without Federal Regulation.

"Each state . . . has adequate laws against criminal fraud, larceny, and embezzlement," the leaflet says. "Employers administer 90 per cent of the pension and welfare plans, and there have been no abuses found in the funds operated by employers." Single copies of the leaflet are free. Write: Chamber of Commerce of the United States, Washington 6, D. C.

- ◆ **NOT SO SOLID SOUTH**—In a recent Bulletin of Southern Industrial Council, Thurman Sensing, V.P. of SIC advises: "Reasoning with the Kennedy administration is not likely to pay off. The New Frontiersmen don't give attention to the South because they believe they have the South in the bag politically."

. . . . . REPRINTS AVAILABLE . . . . .

Write the editors of SPI for small quantities of the following at no charge.

- **SESCO 1,000,000 KW PLANT**—A 16-page folder describing this large new Alabama plant, serving Alabama Power Co. and Georgia Power Co., is a combination of two technical articles from SPI's September and November, 1960, issues.
- **ELECTRICAL DISTRIBUTION FOR LARGE PLANT**—An 8-page special report prepared jointly by Director of Facilities, the Consultants, and the Contractor—describing plans and installation of all electrical services for new plant of Texas Instruments Inc., Dallas, Texas.
- **HOW EPOXY CAN SERVE YOU**—4 pages. Tells exactly how 10 separate repair jobs were handled and describes several epoxy mixes that are good for maintenance jobs.
- **ORIFICE METER INSTALLATIONS**—8 pages. Tells what the plant man needs to know about installation to get accurate, dependable service.
- **MATERIAL HANDLING EQUIPMENT**—An 8-page special booklet prepared by the editors of SPI from equipment manufacturers' releases. Lists 69 catalogs and describes 22 items of new equipment.
- **THERMAL INSULATION DIRECTORY:**  
Tells where to get service and technical data..... 6 pages
- **WATER TREATMENT DIRECTORY:**  
Tells where to get service and technical data.....12 pages
- **AIR & GAS CLEANING DIRECTORY:**  
Tells where to get service and technical data.....16 pages
- **COMBINED GAS-STEAM CYCLE PERFORMANCE:**  
First year report on new plant, West Texas Utilities Co.... 6 pages
- **PAINTS & PROTECTIVE COATING DIRECTORY:**  
Tells where to get service and technical data.....12 pages
- **SALES-SERVICE DIRECTORY** for The Industrial South-Southwest gives an up-to-date list showing where to get engineering assistance and whom to call. Includes home office for each company and shows the nearest representative for your area—address, phone number, etc., for all Advertisers now serving you through SPI.....16 pages



ONE OF A SERIES OF CHATS ABOUT  
CONSERVATION AND CONTROL OF HEAT

# SARCO TOPICS

## MODERNIZING A STEAM SYSTEM MEANS TRAPPING, TOO

Take an older building that has generated its own steam for decades and let's say it's switching to district steam. How can it take advantage of switch-over to rid itself of those classic symptoms of antiquated systems: trap maintenance at overtime rates, water-hammer, and live steam loss?

Well it just so happens a 17-story office building at 635 Madison Avenue, New York, recently did just that. Its steam system was overhauled; but recovery is now complete and it didn't hurt a bit.

First, let's look at the system as it was: Maintenance of the old system had to be done at overtime rates in off hours, because the system could not be shut down during business hours. There were frequent breakdowns. Passage of live steam into return lines when traps failed open not only wasted energy but caused water hammer, and when traps failed closed, water accumulated in steam supply mains and equipment.

The reason we give you this dreary picture is that it's so typical of old systems, and so easily fixed. The building management simply replaced bucket and float traps with Sarco Thermo-Dynamic Steam Traps, Type TD-50, matched and correctly sized to the application. And at the risk of sounding like a TV commercial, results were immediate: maintenance practically



zero, no water hammer, no loss of live steam, engine room crew free for other jobs. And, need we add, considerable savings.

We find it difficult to be modest about the TD-50 because it comes so close to being a cure-all. The facts are these: It has only one moving part, a stainless steel disc; it shuts off *positively*, so no steam can be lost; it discharges condensate as rapidly as it is formed; its pressure range of 10-600 psi makes it possible to standardize on one steam trap for a variety of applications that formerly required traps of many types and ratings.

Funny thing is, the TD-50 is so dog-gone simple and small, people find it hard to believe it does what it does. At 635 Madison Avenue, for example, changeover took only 30 minutes per trap, and trapping was accomplished with a few pounds and cubic inches of traps where hundreds of bulky pounds were needed before to do the job.



Write us for details, won't you? You've nothing to lose but your troubles, your waterhammer, and your worries.

## HEATING COILS CAN CATCH COLD

Let's face it: even the best "non-freeze" air heating coils may freeze if they handle incoming air even slightly under 32°F. and aren't drained properly. Let's face it again: It's not inadequate steam trapping capacity that's most usually to blame. We don't mean to belabor the point, but if trap inlet pressure falls lower than trap outlet pressure, condensate is going to collect in the coil. And it's bound to freeze below 32°F. Take a preheat coil designed to heat air from 0°F. to 50°F. using steam at

a maximum pressure of 10 psig. As the outside air temperature rises above 0°F. heat demand decreases the temperature controller reduces the steam pressure to compensate for reduced heat demand, and you're ripe for ice cubes in your coil tubes.

At Sarco we firmly believe that practical help is much more useful than sympathy noises. We can tell you (if it happens to be you who are caught with your temperature down) of at least three cures for fatal drop in pressure differential. They're quite simple and we would show not the slightest hesitation about revealing them to you.

In fact, we'd also like to send you a master chart that enables you to check at a glance the danger point in handling outside air—an extremely useful piece of information—and a bulletin on Float-thermostatic steam traps.

It may hasten matters if, when you request this bundle of facts, you refer to the literature as Sarco Technical Bulletin No. T503.

## SOUTHERN COMFORT

It's true what we've said all along about Dixie: Sarco is well represented in the South. In fact, there are Sarco representatives in 29 southern cities. This means that your pesky problems of conserving and regulating heat have available solutions nearby. No room for addresses and phones here, but here are the southern Sarco cities and the organizations to call. Alabama, Birmingham, Bratton Sales Engineers; Arkansas, Little Rock, J. L. Brown Sales Co.; D. C., Washington, Sarco Company Inc.; Florida, Pensacola, Sansing Sales Engineers; Tampa, O. H. Howell Mfrs. Agent, Inc.; Georgia, Atlanta, John F. Templeton Co.; Louisiana, Shreveport, J. W. Cherry Company; New Orleans, Frank A. Birdsong; Maryland, Baltimore, J. E. Perkins Corp.; Mississippi, Jackson, Robert Porter; Missouri, Kansas City, Smith Steam Spec. Co., Inc.; St. Louis, Sarco Co., Inc.; North Carolina, Charlotte, Hoffman & Hoffman Co.; Raleigh, Hoffman & Hoffman Co.; Oklahoma, Tulsa, Vanco Engineering Co.; South Carolina, Columbia, Hoffman & Hoffman Co.; Greenville, Hoffman & Hoffman Co.; Tennessee, Knoxville, Walter F. Sutton; Texas, Dallas, Gilbert Engineering Co., Inc.; El Paso, Engineered Equipment Inc.; Ft. Worth, Gilbert Engineering Co., Inc.; Houston, Esch and Associates, Inc.; San Antonio, L. S. Pawkett & Co.; Virginia, Richmond, Robert S. Lovelace Co., Inc.; West Virginia, Charleston, Angus Gillis & Son.

Pardon our monopolizing the conversation in this series of paid communiques, but we're trying our best to interest you in certain subjects that concern us both—to the point where you'll communicate.

8598

# SARCO

SARCO COMPANY, INC.  
635 MADISON AVENUE, NEW YORK 22, N. Y.  
PLANT: BETHLEHEM, PA.

STEAM TRAPS • TEMPERATURE CONTROLLERS  
STRAINERS • HEATING SPECIALTIES

**Coming in JANUARY  
Southern Power & Industry  
WATER TREATMENT**

Reference Guide and Buyer's Directory (included in SPI's regular January '62 Edition) will feature:

*Reference Guide  
and  
Buyer's Directory  
for the  
South-Southwest*

**NEW PRODUCT BRIEFS & BULLETINS—**

chemicals . . . feeders . . . deionizers . . .  
filters & purifiers . . . softeners . . . supply  
systems . . . ion exchangers — applicable to  
heaters, piping, cooling systems, boilers, turbines  
& auxiliaries, processing equipment, etc.

**SALES ENGINEERS** serving you in the industrial  
South-Southwest — Directory type listings,  
including name, address, and phone numbers.

This is SPI's annual technical service aid in the  
**WATER TREATMENT** field for 1962.

This edition, including the Reference Guide  
and Buyer's Directory for the South-Southwest  
will be a real service to you and 17,500 other  
Consulting-Engineering-Operating-Maintenance  
personnel in over 12,300 Southern & South-  
western industrial plants (manufacturing, process,  
utility and service).



## Power from 'Muddy Waters'

In the land of the old Dakotas (one of the confederated tribes of the powerful Sioux) rises a new dam at Big Bend Reservoir on the Missouri River whose yellow flow near its mouth gave rise to its name, 'Muddy Waters'.

Harnessed by the U.S. Army Corps of Engineers, these waters will provide electric power for the development of industry and agriculture throughout South Dakota and other states in the Missouri River Basin.

Eight propeller water turbines for this project are now being built in Canada to 'ENGLISH ELECTRIC' designs by John Inglis Co. of Toronto, a member of the world-wide 'ENGLISH ELECTRIC' Group of Companies.

Amongst the notable hydro power stations in North America equipped by 'ENGLISH ELECTRIC' are Beauharnois No. 3 and Robert H. Saunders on the St. Lawrence; Priest Rapids and McNary on the Columbia; Table Rock on the White River, Missouri; Chute-des-Passes and Bersimis in Quebec; and the Canadian Niagara pumped-storage station.

With factories in five continents, the Group is near at hand to any undertaking needing power engineering and can provide anything from a small individual drive to a comprehensive scheme with generating plant using steam, water, gas, oil or atomic energy.

# 'ENGLISH ELECTRIC'

**Agents:** ENGLISH ELECTRIC CORPORATION, 750 Third Avenue, New York 17, N.Y. Telephone: MURRAY HILL 7-0303

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Charles R. Lee & Associates, Inc., 3796 West Flagler Street, Miami 44, Florida. Tel: HIGHLand 4-7414

**IN U.S.A.** A model of the runner for one of the eight 90,300 h.p. propeller turbines to operate at a head of 67 feet. These are being built in Canada for Big Bend Reservoir, South Dakota.



**IN WALES** Works assembly of one of four 105,000 h.p. Francis turbines for a head of 970 feet, to be installed at Ffestiniog Pumped-Storage Station.



**IN AUSTRALIA.** Four high-head Francis turbines and a spare runner supplied to the Tumut 1 Station, Snow Mountains. These turbines, which can deliver 129,000 h.p. at 1,065 feet head, are amongst the most powerful at this head in the world.

# INDUSTRY SPEAKS



## How to Analyze Industrial Building Costs

Some major myths about industrial building costs were discredited recently by Frank L. Whitney, engineering vice-president of Walter Kidde Constructors, Inc., and the featured speaker at the Industrial Building Congress.

"Ask any ten owners of industrial facilities how to cut plant building costs five per cent, and nine of them will immediately suggest elimination of the fancy front entrance and plush lobby, and the substitution of a cheaper wall material," he said.

"Not enough managers would believe, for example, that a slight alteration in the air conditioning requirements might save twice as much as deglamorizing the walls. This discussion of walls develops into 98 per cent of the conversations but involves only about two per cent of the cost," he said.

Mr. Whitney claimed that corporate officials are too quick to criticize a building simply because it costs more dollars per square foot than another structure on the other side of town.

"This numbers game — which has never been more popular than in today's period of tight profits—usually results in management wielding the cost-cutting axe in the wrong direction," he said.

Square foot cost comparisons between industrial buildings are misleading, Mr. Whitney said, because no two facilities are exactly alike. To be completely accurate, it would be necessary that both buildings be identical — be built on identical sites at the same time, and manufacture the same product.

This is not true of all buildings, he pointed out. In schools, for example, cost comparisons can be made in terms of cost per student, in hospitals in terms of cost per bed, and in electric generating plants in terms of cost per kilowatt.

In contrast, an industrial facility can have a variety of functions and an endless variety of occupancies. These factors "make industrial plant construction, design and pricing separate and distinct from almost any other kind of architecture," Mr. Whitney said.

What factors, then, determine industrial building costs? According to Mr. Whitney there are a number of valuable measures, most of them overlooked even though they are easily applied.

One of the best of these is personnel density — the number of people a plant houses per square foot.

"People have a dramatic effect on the cost of industrial structures. The higher the personnel density, the greater the need for increased heating, lighting and air conditioning and other facilities. Hence, given two identical buildings, the cramped one will be more expensive," he explained.

"Another vital yardstick, particularly in industrial laboratories, is the ratio of assignable space to gross space. Assignable space is that portion of the structure in which people work; gross space is the total area of all buildings.

"About half of a facility's area should be assignable, at least where there are 100 or more workers. If the percentage of the assignable area is 60 or more, it is probable that there is inadequate provision for services. If the percentage falls under 50, it is probable that the facility is too luxurious.

"Another important cost factor is *master planning*. Although one industrial facility may appear to have a lower price tag than another, it may not have been master planned. As a result, it will be far more expensive to expand and modify than a facility where adequate provisions were made at the start. And, it may be far more expensive to maintain.

"Another area of analysis that deserves special attention is *site cost*. Too many companies are lured to certain sites because of low purchase price. But if they considered the cost of bringing in necessary services, they would find no savings over any number of more expensive sites where water, power, sewers and other services are in and available."

These are just some of the major variables that must be taken into account if a meaningful square-foot cost comparison of industrial facilities is to be made, Mr. Whitney said.



# Acme Announces

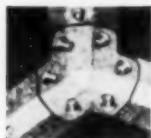
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# TIMELY COMMENTS



## Water!! The Heat Is On

**CHOOSING SUBJECT MATTER** for our monthly "Timely Comments" page doesn't normally give the editors much trouble. Letters from engineers in our area and How-to-Do-It articles offered for publication give a fairly good idea of what our readers consider "timely."

Sometimes we get a surprise in analyzing these comments from the South and Southwest. For instance, right now we find unusual emphasis on **WATER**. Not solely the expected discussions of water treatment — but just water. Even in this area where water is considered abundant — engineers are thinking about conservation and costs.

The very abundance of water has caused neglect of industrial supply systems in the past. Leaks have been tolerated and once-through hook-ups for processing have been common. Pumping power is seldom metered and excessive pressure is okay unless it hurts. Now the hurts are being felt and the not-so-rosy profit situation is causing a general search for savings. Also, modern industrial procedures are increasing the demand for cooling water. Air conditioning is a big item, and faster processing and increased machine speeds are requiring water cooling in many instances where ambient air was once sufficient.

Perhaps general industrial growth is the principal cause. But in any event, a great many industrial plants are reviewing their entire water supply-and-use situations, with economy the principal aim.

Results of thoroughgoing engineering studies and corrective measures are in some cases little short of astounding.

In our October Better Production issue is one article that tells how a large Alabama metal tube manufacturing plant cut water cost 60 per cent by reducing consumption from 16 million gallons a week to 6 million gallons a week. Another article tells how a chemical company reduced suspended matter in its cooling tower; and another tells how cooling tower capacity was greatly increased at minimum expense.

One article shows how super-clean demineralized water saves \$30 a day in product spoilage. And

more conventionally, another plant tells how pH is controlled by an automatic alum feeder — compensating for changes in both flow rate and quality of raw water.

Improvements in a Florida plant are described in a brief article in this issue. In this case the plant was faced with a shortage, but a conservation program resulted in a 2000 gpm reduction which eliminated the need for new wells.

Just as this was being written, an article came in telling how a big North Carolina fabricating and assembly plant is saving 21,000,000 gallons a year over previous methods. The money saving amounts to \$7,884 a year, and the improvement was accomplished with very little expenditure.

So water conservation certainly is a timely subject in SPI's service area — in spite of our big rivers and high annual rainfall.

All water is expensive, but as it is specially treated with special equipment for specific industrial uses — the price goes up.

Judged by the interest we see in the field, "the heat is on" to secure better utilization, better treatment, and lower cost per thousand gallons. That is because water (even "free" water) is a big item in most industrial plant budgets. A modest percentage saving runs into real money.

If further evidence is needed to prove the importance of water in Southern industry, consider the activity of leading conditioning and treatment firms in this area. Manufacturing and service firms in the treatment field are fully aware of sales opportunities in the 19 Southern and Southwestern states.

Leading water treatment companies have many representatives in convenient locations throughout the area, but they are not always easy for the plant engineer to locate on short notice. That's where SPI "sticks its oar in." Our January issue will carry a directory showing where these sales and service people are located, and how to reach them. Headquarters for each firm will be listed — then followed by the most convenient sales and service contacts for your area. This is a directory that you will keep conveniently at hand for quick use.

**JAMES SCHMIDT,  
MACHINIST, DEAD IN  
TRAFFIC ACCIDENT**

MIDDLETOWN, Jan. 21  
—James Schmidt, 47, of Elm Street, a lifelong resident of this city, died when his car ran off the road and overturned downstate yesterday. The State Police report that Mr. Schmidt was dead on arrival. They believe that he must have fallen asleep at the wheel, since the car showed no mechanical defects. He was returning home from a hunting trip.

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READ  
THIS...**

**READ THIS!**

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High vacuum exhausts placed at the tool point on all machines prevent machined particles of the toxic material from ever entering the air. Absenteeism is minimized when men work in the clinical atmosphere generated by the exhaust system.

### ***Florida Beryllium Finishing Plant Keeps Clean and Healthful***

## **Air Control and Recovery System**

**TERMED** "the most promising structural material of the Space Age," and the "Wonder Metal of the Future," beryllium has already proved to be superior to other metals in many of today's aerospace applications.

Beryllium's unique combination of physical and mechanical properties has given it a wide range of actual and potential usefulness which makes its elastic, thermal and nuclear aspects ideally suitable in nuclear power devices, aircraft and missile components and instrumentation.

Aside from the problems of cost (about \$150 a pound in a finished

**By HARRY J. MILLER**  
Sarasota, Florida

product) owing to beryllium's scarcity and difficulty of fabrication, Sarasota, Florida's American Beryllium Company had also the problem of air control in its mammoth production plant.

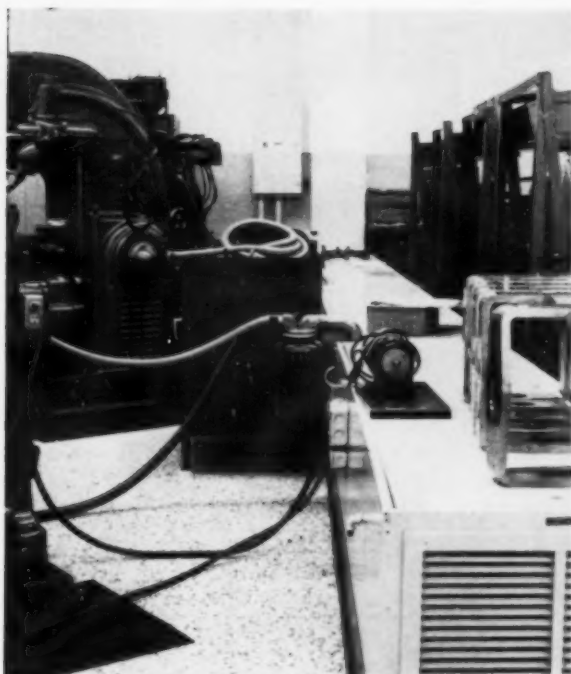
In the manufacture of precision components having tolerances in the fifth decimal position and working beryllium metal which has the highest known strength-to-weight ratio (two-thirds the weight of aluminum and three-fourths the strength of steel), the production

of pure beryllium parts, it is almost mandatory to remove all toxic dust from the manufacturing area.

Sufficient experience has been accumulated from producers and fabricators to demonstrate the toxic effects of working with beryllium. Thus it becomes necessary to install a system of air control designed to be integrated with a

**COVER PHOTOGRAPH**—Note nozzle of the air stem directly in front of the cutting tool to inhale the most minute beryllium fragment.





Flexible hoses to two machines feed to a jar connected to the main ducting system. Square machinings are beryllium components destined for space-age missiles.

program embracing medical, personal and industrial hygiene elements.

As far back as 1948, the Atomic Energy Commission established maximum allowable concentrations of beryllium in the atmosphere as standards of safety for persons in and around plants. Where the recommended exposure criteria are held, AEC observers report a complete absence of lung involvements traceable to beryllium dust or fumes.

In the case of the Sarasota beryllium firm, the company designed and built and installed an original system for the electronic precise control of temperature and humidity which also functions to recover all beryllium machinings from each of the numerous machines in the spacious plant.

Temperature is controlled within one degree F, and humidity is kept at the ideal level. The evacuation system provides a high velocity exhaust at all work points in the entire shop from which the potentially toxic air is ducted back to 4 large tubular bag separators and discharged through rotary exhaust-

ers having a combined horsepower of 200.

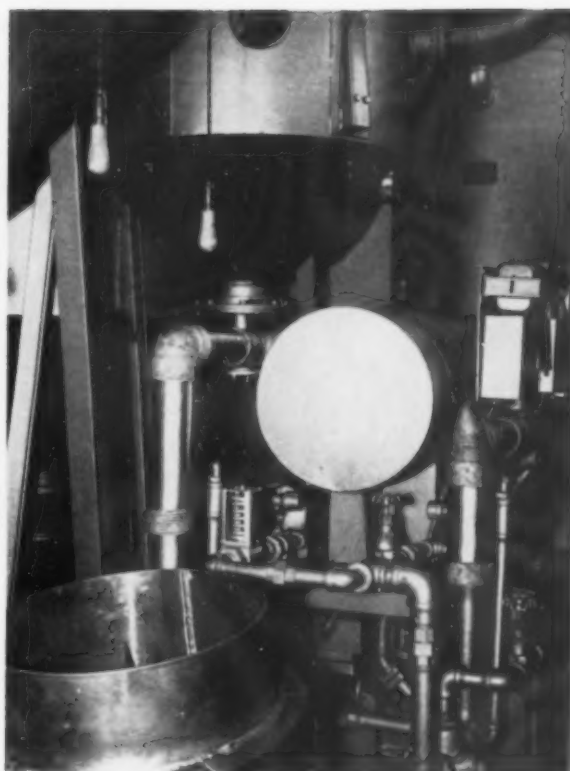
Air counts are taken twice daily at check points in the plant and at the exhaust exit of the sprawling system outside the plant. Filters used in these counts are forwarded to an independent laboratory for analysis.

According to the firm's Ronald Murray: "Our air counts are consistently better than the safe level used as a standard in the beryllium industry."

Air is changed throughout the plant every 7 minutes and is filtered and washed by means of a high-voltage electronic air filter.

The complex, \$150,000 exhaust network thus provides an atmosphere comparable to that developed in the finest hospital operating rooms.

So sterile is the working atmosphere, according to Mr. Murray, that men who have contracted colds during week-end absences find their ailments clearing up within 48 hours after they have returned to work. Obviously this aspect of the air control system is a potent factor in reducing absen-

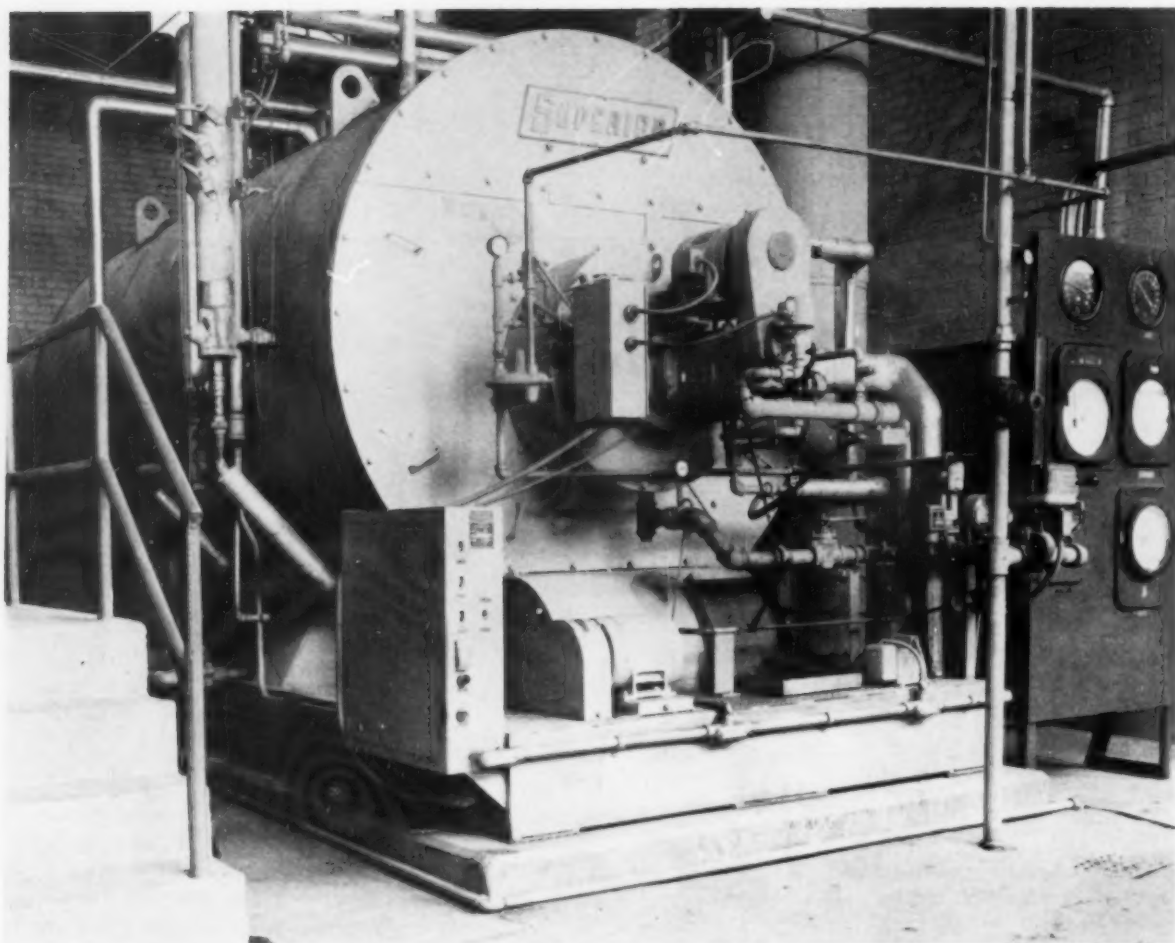


Part of the complex air control system designed by the company. Down front is the container that acts as the repository for beryllium dust collections which are recoverable for \$100 a pound, a most significant economy aid rendered by the system.

teeism due to respiratory malfunctions.

Another feature that justifies the major investment in American Beryllium's precision-controlled air system derives from the fact that closely-controlled temperatures afford exact gauging of extremely fine surface finishes as well as intricate contours. Thus output is speeded up, and the intricate exhaust system helps make possible volume production with a high degree of accuracy.

This lends plausibility to the idea of providing the long-sought goal or repeatability in beryllium fabrication without sacrificing the precision tolerances which beryllium can hold and maintain over a wide range of operating stresses and temperatures.



*Coats & Clark Engineers report on how to get economy at low load*

## Package Boiler Cuts Costs

**WITH A BIT** of Scotch blood in its financial veins, it is not surprising that Coats & Clark Inc. makes good use of its money.

The company is part of a worldwide organization with many plants, and its history of steady advance under an unbroken continuity of management extends back 149 years. Seven of the U. S. plants are located in Georgia.

Both J & P Coats Company and The Clark Thread Company originated in Scotland and operated continuously as independent cor-

**By A. C. SPARKS**

**Mechanical Design Engineer  
Coats & Clark Inc.  
Toccoa, Georgia**

porate entities in this country until the were combined as Coats & Clark Inc. about eight years ago. While there are other Coats & Clark products, notably Coats & Clark zippers and Red Heart hand knitting yarns, the company is best known for its cotton sewing thread — and through its predecessors has

been the world's leader in this field since 1812.

While Coats & Clark is quick to grasp the opportunity of building new plants with most modern equipment, it is equally diligent in maintaining and modernizing existing plants to keep them producing at high economy. Two plants at Toccoa illustrate the two extremes. Plant No. 2, three miles south of town, was built in 1955 and is considered one of the most modern thread processing plants in the world. But Plant No. 1, in the heart

of town, is an old plant that serves as an example of continued operation at good economy because of good maintenance procedures and "spot" modernization.

That is the point of this short article — replacing individual elements when the proper time comes.

### Reason for Change

Changes in the physical make-up and operation of the steam generating equipment at the old No. 1 Plant were made as a result of sound economic appraisal. Unlike most instances requiring replacement, the equipment was neither inadequate nor under condemnation by a governmental or insurance company inspector. Instead, modernization was undertaken in the true Scotch tradition of getting the most for money spent.

Integration of old No. 1 Plant wet finishing processes with the new No. 2 Plant resulted in a reduction of heating and process load from approximately 25,000 lb per hour to approximately 6,000 lb per hour. Operating costs to generate steam, however, remained virtually the same, and was considered to be excessive for the reduced load. Consequently, a study was undertaken to determine means of generating steam more economically.

There were three 250 bhp HRT stoker-fired boilers installed in the boiler plant. One had been installed new in 1947. The other two were of 1924 vintage. Coal was delivered by railroad car and unloaded adjacent to the boiler plant. Feed to the stoker hoppers was by a common coal conveyor.

The plant was equipped with the usual accessories, including a steam-operated feedwater pump, a condensate receiver unit, a deaerator heater and feedwater treatment units. In addition, due to a past attempt to fire oil, there were two underground oil tanks and pumping equipment already installed. All three boilers were served by a common breeching and stack. One fireman was required to be on duty three shifts per day.

### Equipment Selected

It was determined that the most economical means of generating steam would be by the automatic

firing of natural gas on an interruptible basis with No. 6 fuel oil for standby. This meant an annual increase in fuel cost of approximately \$3,000.00, but would net an annual expected cost reduction in excess of \$8,000.00 by eliminating the need for attending firemen.

Two proposals were considered for making changes to permit automatic firing. They were:

1. Convert the newer of the three installed HRT boilers to automatic firing.

2. Install a new automatic packaged steam generator with sufficient capacity to handle the reduced load plus reasonable excess for future expansion.

Surprisingly, due to the need of elaborate equipment and controls to convert the HRT boiler, the cost of Proposal No. 1 would have approached that of No. 2. Because of grade variations in No. 6 oil and because of the critical oil temperatures required for automatic firing, elaborate equipment and controls would have been required.

The installation of an automatic packaged steam generator was judged to be the better choice from the standpoint of maintenance, safety of operation, expected service life, and overall boiler efficiency — especially at low load. Ease of installation and simplified fuel handling were advantages also taken into consideration.

### The New Boiler

After a study of several applicable packaged type generators, the unit selected was a Superior Combustion Industries' 250 hp, Type F packaged steam generator built to ASME Code for 125 lb steam pressure. The unit and accessory equipment was purchased factory-assembled and fire-tested through John A. Dodd Company of Atlanta. Installation of the unit was handled by Coats & Clark, with start-up under the supervision of John A. Dodd Company.

The Type F is a 4-pass, induced draft boiler suitable for firing natural gas or No. 6 fuel oil. The burner is a Superior rotary cup type oil burner, with a gas ring, and is equipped for fully automatic modulating fire control and low-

fire start. The boiler was furnished with factory insulation and metal jacket on the shell.

Controls include Fireeye combustion safety controls, Maxon Series 600 safety gas shut-off valve with manual reset, an alarm horn to sound either on flame failure or low water, dual low-water cut-off controls (one float type and one probe type), electric oil preheater, and a Rockwell No. 1001 gas pressure regulator modified to close and shut down the boiler either on high or low gas pressure.

### Auxiliaries

The new generator is installed in space where two of the old boilers due to sharing of a common fire wall were removed. One of the old boilers is maintained in serviceable condition for standby coal firing.

All auxiliary equipment in the old plant, such as feedwater and oil pumps, heaters, and water treating equipment, is continued in service. Operating meters and gauges were mounted on a panel as shown in the photograph. To facilitate automatic operation, a Westco bronze fitted boiler feed pump was installed for normal operation.

### Fuel

About 95 per cent of the operation is with natural gas as fuel. Gas is supplied by the city and is purchased on a "shut-off" contract to take advantage of the lower rate. Thirty minutes' notice is given by the city prior to interruption, and the generator is easily changed over to oil-firing in less than five minutes. Adequate oil supply is provided by underground storage adjacent to the plant. Oil heaters, both on the unit and in the storage tanks, are kept in operation, ready for service during periods of expected gas interruption.

### Operation and Performance

Automatic features of the packaged generator have proved entirely satisfactory. The generator operates unattended, but is examined several times a day by the plant mechanic. Bell alarms are properly located to get immediate attention

(Continued on page 34)

in case of automatic shutdown for any cause.

City water is used for boiler feed, and relatively simple internal treatment keeps the heating surfaces clean and free of corrosion. Internal inspection is made twice a year, and the present treatment with Betz chemicals seems adequate and effective.

Operating economy meets all expectations indicated in the original engineer's prediction. Boiler effi-

ciency is guaranteed at 80 per cent for average operation, and several tests have proved that this efficiency is being obtained.

Under normal process steam requirements the boiler operates on its modulating control, without burner shut-off. But in periods of low steam demand, the burners cut on and off automatically as required to meet minimum demands. No steam accumulator is provided. The boiler volume is sufficient to

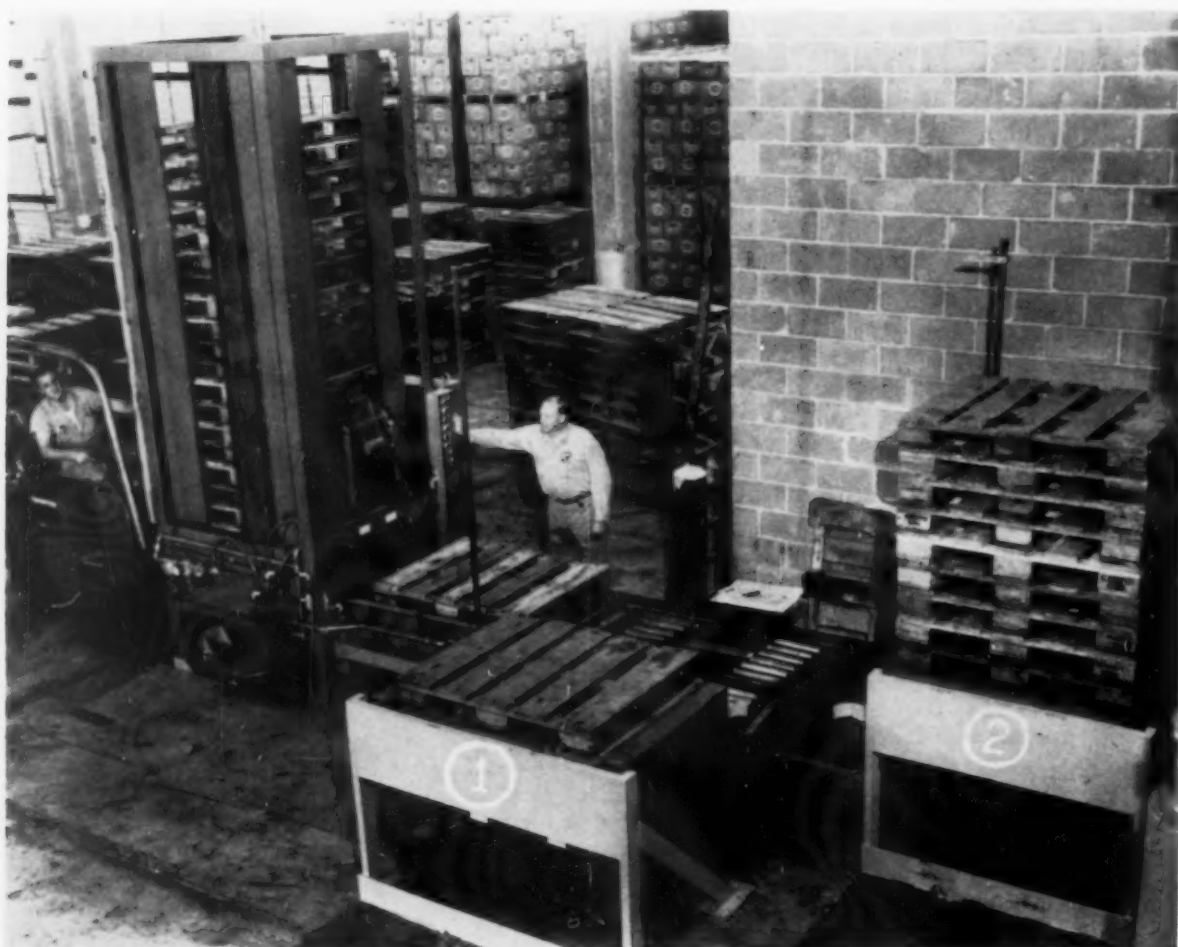
supply minimum requirements for about 15 minutes with a 25 lb pressure drop below the normal operating pressure of 75 pounds.

Because of changes in steam requirements, no direct economy comparison with the old boilers is possible. But with the high efficiency of the new unit and its low heat storage during on-off operation, it is known that the expected saving of \$8,000.00 per year is being realized.

### ***Automatic Pallet Inspection System Reduces Damage***

A **PALLET** dispenser equipped with special lift devices enables the inspector to scan tops and bottoms of pallets in a large food processing plant. Through the use of push buttons, he can optionally dispatch the pallet being inspected onto an automatic pallet stacker (indicated #1) where damaged pallets are picked off and repaired. Or, if in satisfactory condition, he can send it onto stacker (indicated #2) from where undamaged pallets are returned to the palletizing area. The magazine of the pallet dispenser is constructed to accommodate up to 20 pallets at any one time.

*Photo—Courtesy Alvey Conveyor Mfg. Co.*





## Cathodic Protection Cuts Down-Time for Texas Paper Mill

A LARGE TEXAS paper mill experienced corrosion leaks in approximately 1,500' of 36" diameter buried steel water lines which were installed in 1953. These lines were coated and wrapped welded steel, but corrosion leaks occurred after two or three years of operation.

Many sections of this pipe were 8' to 10' deep beneath concrete roadways, making the problem of detection, excavation and repair slow and costly. At times, a slow-down or partial shut-down was necessary while leak repairs were underway, and the cost of these repairs became appreciable as 15 leaks occurred in a period of about six months.

Faced with this problem, the mill's engineering department arranged to have a corrosion study made by engineers of Electro Rust-Proofing Corporation. From tests performed, it was concluded that corrosion was caused by two factors:

1. The bi-metallic couple set up between the steel pipe line and a copper grounding system.

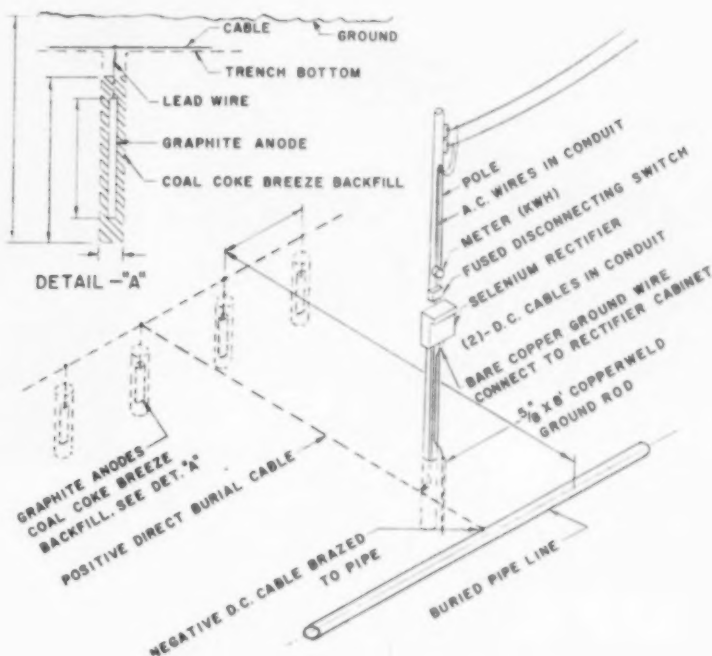
2. The corrosive soil condition.

Tests also indicated that the piping was subject to a possible loss of 30 lb of steel per year.

After analyzing all the data, the corrosion engineers made recommendations which included:

1. Isolation of the piping from all other metallic structures and utilizing insulating couplings and gaskets.

2. Installation on the water line of cathodic protection consisting of a 12% ampere rectifier and a 12 graphite anode ground bed, each anode being 3" diameter by 60" length.



3. Installation of twelve 17 lb packaged magnesium anodes on a gas service line which the corrosion study indicated to be subject to the same corrosive conditions as the water line.

4. Electrical isolation of the gas line from its source of supply and from processing facilities by insertion of insulating fittings.

All recommendations for isolation were carried out by the paper mill personnel. The cathodic protection systems were installed by Electro Rust-Proofing in May 1957,

as shown in the diagram. Final tests indicated a protection system life of approximately 20 years.

Immediately after installation one or two leaks were reported which might have been attributed to corrosion, but no further corrosion leaks have been reported in the past four years. It has been estimated that this preventive maintenance program paid for itself in the first year and has been saving money since then by reduced maintenance costs and shut-down time.

## Two Hands Better Than One

FOR AN EXAMPLE of efficient mechanization, take a look at the operation shown here. Port Drum Company, Port Arthur, Texas, is painting reconditioned steel drums. Note that each operator is using two Graco Hydra-Spray guns — one for red and one for white.



## **Dependable Controls Depend on Care**

**By H. H. WIGGINS**

Supervising Engineer  
Goodrich-Gulf Chemicals, Inc.  
Institute, West Virginia



The key to performance is the starter cubicle in motor control center.

**THE AVAILABILITY** of electricity for lighting and power uses has become so dependable that many times the supply feeders and protective equipment in a plant are more or less forgotten until the day when a feeder fails or a cubicle flashes over. Electricity as the silent servant of mankind cannot be forgotten. The components over which it is applied must be maintained just as are pumps and other equipment.

### **Responsibility**

Our program of maintaining electrical services begins with the electrician. We believe that the feeders and control centers "belong" to the electricians and operate under a "hands off" policy for others. The push button and electrical controls which cause a pump to start or an agitator to turn likewise belong to operators and are off bounds for electricians except, of course, for maintenance.

We have lost several motors because overzealous production people, anxious to make a quota, repeatedly reset a tripped starter on a motor circuit. It took some "selling" to convince our production people that the reason we spend money for starters is so that they will trip when the circuit is over-

loaded and thereby protect the equipment.

### **Trouble Shooting**

When a call is received that a motor has kicked out, an electrician is dispatched to the area to diagnose the cause. He checks to be sure the motor is free to turn, checks belts, if applicable, and makes a visual inspection of the feeder to the motor in trouble. Touching the motor will reveal if it has overheated. In general, if you can hold your hand on the motor body it is not too hot. After these preliminary checks, the electrician proceeds to the control room to reset the starter.

Starters, of course, are backed up by a breaker on the motor circuits and while the electrician is in the control room he visually checks the breaker to determine if it has tripped due to overload.

After resetting the starter, the electrician returns to the location of the motor in question and puts a "tong" tester on the leads at the motor. (This is a split core ammeter which can show if the motor is overloaded without disconnecting any leads.) The electrician then advises the operator to start the motor. This eliminates any controversy over whether the electrician

interfered with the process by starting a motor at the wrong time.

The operator starts the motor while the electrician observes the motor and tong tester. If the motor kicks out again, the electrician knows how much it is overloaded. He then uses a portable megger to read the resistance between phases and between phases and ground. If he gets good readings, the trouble is, in most cases, mechanical.

Now, here is where the arguments begin as to whether the motor is at fault or the driven equipment is at fault. A very simple step can be taken, however, at this time in most all cases to isolate the trouble. But somehow, it is difficult to get people to take the step without reminding them each time. By simply disconnecting the motor from its mechanical load and restarting it while observing the tong tester, the source of the trouble can be found. If the amp load continues to be high, then the chances are that a motor bearing is bad. If not, the driven equipment is at fault. Corrective action can then be taken.

### **Maintenance**

Although the protective equipment such as breakers and starters in electrical circuits is, without ex-



Using tong tester to check motor load.



Resetting starter and checking breaker.

ception, in a housing and is seldom checked, the price paid for overlooking this equipment can be quite high.

We make it a point to check our protective equipment at least once a year and more often if possible.

We use a portable high-current tester to put a false load on the motor circuits. The device has a built-in timer that clocks the time required for the starter to trip. Any starter that fails to operate according to the manufacturer's specifications is repaired at once.

If a motor has a history of frequent kick-outs due to the nature of its service or for any reason, we install new heaters in the starter at certain intervals depending on the frequency of the starter operations.

Here is an area that we feel is often neglected — changing heaters in starters. We feel that heaters that are subjected to abnormal service because of frequent overloading lose their calibration and should be replaced.

If a starter fails to operate when it is supposed to, the resulting damage can be great, but for some reason this key part of an electrical protective system is often ignored. The cost of heaters is negligible compared to rewinding a motor. We believe it economical to change all heaters after five to ten years' service as a precaution.

In areas of the plant that have excessive moisture present, we megger key electrical motor cir-

cuits prior to start up to prevent motor burn-outs and wiring flashovers. If a motor meggers low, it can be saved in many instances by heating in place with lamps or if it is not too large, by baking it overnight in an oven. There is little that can be done when the power or control wiring meggers low except take a chance that it will improve after being put back in service. Otherwise, new leads must be pulled in.

#### Shop Maintenance

We have found that for a cost of about \$25.00 for labor and material we can recondition Size 1 and 2 starters in our electrical shop and put them in first class condition. This work consists of:

- a. Dismantling
- b. Cleaning all exposed parts with solvent.
- c. Replacing the heater blocks and heaters.
- d. Rewiring, as required
- e. Reassembling

No elaborate equipment is required for this work. Most of the starters in the plant are over fifteen years old so we make it a point to perform this type preventive maintenance on any starter that can be taken out of service for the required time. Starter failures and flashovers have been virtually eliminated.

Prior to starting this program,

we were plagued with flashovers in our control centers. Quite often we found that after one flashover occurred another would follow shortly thereafter.

The cause of the second flashover, we found, was dust being blown around inside the cubicles during the first flashover and providing a path between phases at terminals of the other starters. Vacuum cleaning of control centers when they are out of service has also helped to solve the flashover problem.

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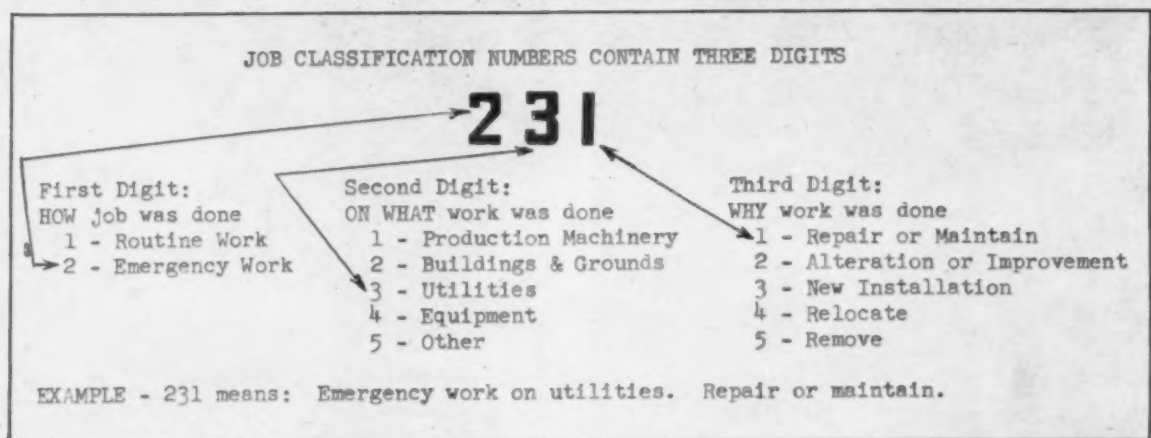


Diagram shows meaning of job classification numbers.

## How Maintenance Charges Are Allocated at Large North Carolina Wool Mill

# Job Classification Tells Maintenance Story

**FREQUENTLY** management calls upon the maintenance department to perform duties, functions, and jobs that could hardly be called "maintenance." When the cost sheet is examined each year, so-called "maintenance" costs may appear entirely unrealistic unless someone has an account showing where and for what the money was spent.

The accompanying description of job classifications used at Chatham Manufacturing Company indicates one way management may be accurately informed about expenditures and activities of the maintenance department.

**A NEW SYSTEM** of job classification numbers is incorporated in our present work order system at Chatham Mfg. Co. These job classification numbers will provide us with much information concerning shop work which was previously unavailable. In addition to aiding in the control of shop labor they will enable the engineering department to present a much clearer picture of its maintenance function to top management for better understanding.

Essentially the job classification numbers are to be used to answer questions such as the following:

1. How much of the shop labor is actually used for maintenance and repair?
2. How effective is preventive maintenance in reducing the above?
3. How much of the shop labor is used to improve existing facili-

ties as opposed to maintaining them?

4. What portion of shop work is planned and what portion is emergency work? Is there improvement in this area?

5. What additions or deletions have been made to capital equipment so that the plant appraisal can be kept up-to-date?

The answers to these and many other questions will give a more complete and clearer picture of shop work than we have ever obtained in the past.

### The Numbering System

Job classification numbers include three digits.

**The first digit** tells **HOW** work was done — emergency or routine.

**The second digit** tells **ON WHAT** work was done — machinery, buildings, et cetera.

By **CLAUDE B. HART**

Chief Engineer  
Chatham Manufacturing Co.  
Elkin, North Carolina

**The third digit** tells **WHY** work was done — maintenance, alteration, et cetera.

Numbers will be derived from the following schedule:

#### First Digit:

1. Routine work
2. Emergency work

#### Second Digit:

1. Production Machinery
2. Buildings and grounds
3. Utilities
4. Equipment
5. Other

#### Third Digit:

1. Repair or maintain
2. Alteration or improvement
3. New installation
4. Relocate
5. Remove

For example: 133 would be the classification number for routine or planned work on utilities and for a new installation. 211 would be the classification number for emergency work on production machinery and to repair it.

As in most systems of this type, the majority of classification num-



SHOP LABOR - JOB CLASSIFICATION REPORT									
DECEMBER 1 TO DECEMBER 31									
	PRODUCTION MACHINERY	BLDGs. & GROUNDS	UTILITIES	EQUIPMENT	OTHER	TOTALS	%	CUM. TOTALS	%
REPAIR ROUTINE	422.0	199.0	79.8	71.1					46.5
EMERGENCY	78.9	5.2	23.8	17.6					7.3
ALTER & IMPROVE	182.7	119.3	28.4	15.1					19.7
NEW INSTALLATION	115.3	13.7	32.6	86.2					15.0
RELOCATE	1.6		4.1	.4					—
REMOVE	2.9		9.2	.3					.8
MISCELLANEOUS				1.7	189.3				10.5
TOTALS									

Figures on this "Shop Labor Job Classification Report" are not actual but serve to indicate how the report may appear. The percentages are approximate and indicate about what the actual division of work is percentage-wise.

bers can be readily assigned. There will be borderline cases. The following comments indicate guide posts for coding classification numbers to these borderline cases.

#### First Digit — HOW

Regarding (1) routine or (2) emergency work — there is little doubt. Emergency work is work which must be done as soon as it is discovered.

#### Second Digit — ON WHAT

(1) **Production Machinery** includes all accessory equipment such as valves, piping, electrical switches, pumps, tanks, instruments, fans, foundations, et cetera, connected to or a part of a single or at the most, two production machines. If the machine were moved and the item involved would move with it to its new location, it should be classified as (1) production machinery.

(2) **Buildings and Grounds.** Anything that is a part of or becomes a part of a building should be classified as (2) buildings. Sprinkler systems, reinforcing (except for one machine) permanent partitions, stock bins, floor finishing, painting of buildings, sealing roof leaks, built-in shelving, et cetera, should fall in this category.

(3) **Utilities.** Main distribution lines for air, water, electricity, chemicals, which serve more than two machines should be classed

as (3) utilities. Also main storage tanks; air compressors; heating; air conditioning, general ventilating equipment; and transformers fall in this category. Also to be included is lighting other than that for a particular machine.

(4) **Equipment.** All necessary items not attached to machines but necessary to their operation — parts bins, conveyors and all conveying equipment as wagons, flats, trucks, loom beams, fork trucks, hoists, and elevators are classed as (4) equipment. Also to be included are desks, tables, intercoms, cabinets and the like.

(5) **Other.** Any work done on items which cannot be classified in any of the above categories.

#### Third Digit — WHY

(1) **Repair or Maintain.** This number is used where the primary purpose of work is to remove worn, broken, or corroded parts and either repair or replace them.

(2) **Alteration or Improvement.** This number is used where the primary purpose is to change or improve the operation of existing equipment. In doing this work it may be necessary to add or remove certain component parts of machines but if the main purpose is to improve or change the operation of existing facilities, then it should fall in this category.

(3) **New Installation.** This num-

ber is to include work done in adding new machinery, buildings, et cetera, which have not existed before. It also includes replacement where this replacement involves the major or primary part of a machine, such as the replacement of a worn out air conditioning compressor. This is the major component of the system and should be treated as a new installation.

(4) **Relocate.** This number includes work where the primary purpose is moving machinery from one location to another and installing it essentially in the same condition.

(5) **Remove.** This is to include work done where the primary purpose is to take out machinery and remove it from operation — either to storage or junk.

Any major job will probably include some work in more than one of the above categories. The entire job should be classified according to the primary purpose. For example, if a new machine is to be added and it is necessary to move other machinery to make room for it, the entire job should be classified as a new installation — number (3) in the third digit.

If there is any doubt concerning the correct classification number, operatives are instructed to avoid guessing and to contact the Maintenance Center and request a classification number.

## "Cross Country" Barrel Conveyor

**PART OF SHELL** Oil Company's long range construction plan designed to streamline its distribution system and give more effective service to customers has been completed at the company's Wood River Refinery near St. Louis.

Completed is a two story lubricants packaging, canning, shipping and warehousing facility, which was built to replace older, less efficient facilities. The plant provides a central distribution point for shipping products to Midwest-ern jobbers and dealers.

The conveyor system, designed and built by Alvey Conveyor Mfg. Co., St. Louis, involves six major functions: 1. Drum handling system in the compounding building. 2. "Cross Country" conveyor system, 3. Drum handling system in new warehouse, including deflector system and drum grouper, 4. Carton handling system, 5. Canning department conveyor system, 6. Automatic Pallet Loader.

Some 230 various brands of Shell products are stored in the warehouse. These products are packed in 33 different containers ranging from four ounce lighter fluid cans to 55 gallon drums.

The most interesting feature of the entire integrated handling system is the "Cross Country" drum handling system described and illustrated here.

Drums of the 55 gallon, 30 gallon and 120 lb keg size are filled in the compounding building and stored on gravity roller lines and live roller conveyors for order filling. A dispatcher releases quantities of one size drums and places a color code marker on the lead drum of the order.

### Cross Country Conveyor

The drums move from gravity storage lines onto a live roller conveyor which carries them into the cross country system.

Shell faced a major transporta-

tion problem in moving filled oil drums and kegs from the compounding building to the new warehouse, 1,250 feet away. This was the kind of problem that had plagued conveyor engineers for years.

Alvey experts decided the job could be done by a system of pusher arms attached to an overhead trolley system. They discussed the problem with several overhead conveyor companies. Their answer? It couldn't be done! Bear in mind that Alvey specializes in package conveyor systems with almost a half century's experience in that field.

This was a problem not often encountered by materials handling people. Pete Horn, Alvey's Vice-President in Charge of Engineering, refused to admit defeat. He designed a system that handles the drums speedily and efficiently. Alvey purchased basic overhead conveyor components and constructed the system.

Here's how it works. A gravity roller conveyor line to span the 1,250 feet distance between buildings was housed in a bridge. Existing buildings located between the compounding building and the warehouse prevented straight line construction and several curves and bends had to be engineered.

As the drums leave the compounding building, they enter the cross country system. A timing mechanism meters the drums so that each is met by a specially designed pusher arm powered by the overhead trolley conveyor. This

metering is controlled by the overhead trolley conveyor to insure one drum per pusher.

At a rate of 45 feet per minute, the drums are pushed across the bridge into the warehouse for shipping or storage. Drums enter the system at about eight per minute. The pusher arms circle at the exit of the cross country system and return to begin another cycle of drum movement and assure a steady stream of drums across the system.

The question, why use this technique of moving the drums instead of powered roller conveyors, might well be asked. The idea was considered and discarded for these reasons:

1. The system is basically a method of transportation and not for storage. Drums do not accumulate on the "cross country." They flow steadily across the bridge into the warehouse.

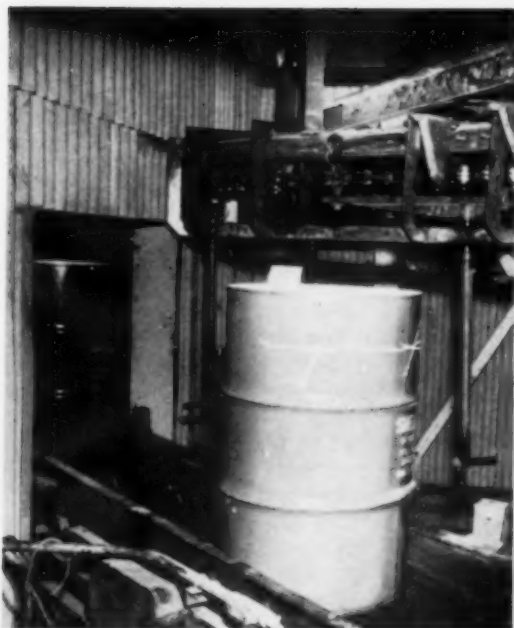
2. Powered conveyors would have of necessity been small sections joined together with accompanying drives and controls. This obviously is expensive. The overhead trolley pushers require only three drives over the entire system.

3. Movement of varied size packages would not be controlled as well over elevations.

The bridge which houses this conveyor system is also used as a support for pipe that transports oil between Shell's new tank farm, the compounding building and the canning lines in the warehouse.

As the drums leave the cross country system, they enter the new





At left, a 55 gallon drum, the first in an order to be shipped, enters the Cross Country system to be transported to the warehouse. As the drum enters the system it pauses momentarily on a belt conveyor to await the trolley pusher arm which will transport it across the bridge. This "metering" of the drums by the trolley conveyor assures only one



drum per pusher. The color code marking on top of the drum will automatically route it within the warehouse.

An order of drums at right, each propelled by its own pusher arm, is moved across the Cross Country conveyor into Shell's new warehouse. The drums travel at a speed of 45 feet per minute.

warehouse via live roller conveyor. Immediately they proceed through an automatic deflecting device. The lead drum in the order carries a color code marker which, when passed under an electric eye, determines if the order should deflect off toward a drum palletizing area or continue onto the automatic

drum grouper at the east end of the warehouse.

The drums accumulate on live roller conveyors and are released into the drum grouper by push button controls. The drum grouper automatically arranges them into two rows of two each for pickup by special fork lift trucks, equip-

ped to handle four drums. When one group of four drums is removed, the mechanism automatically releases four more for grouping. The lift trucks either place them directly into transport vehicles or onto racks for storage. Drum storage capacity is approximately 14,000.

## Valve Stem Leakage Stopped

**THE SKETCH** shows how we improved valves of a certain type that we are using in several places in our power and steam department.

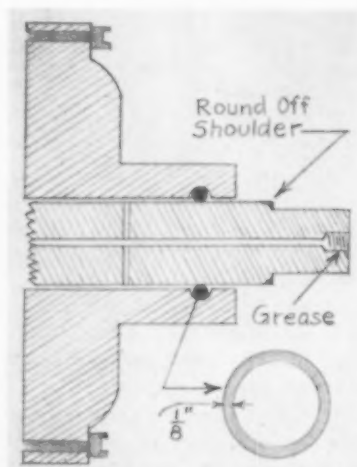
We were having trouble with leakage around the shafts or "stems." Several types of grease were tried, but none gave a satisfactory seal.

Some time ago we came up with the idea illustrated, and installed it on several valves. Since that

time we have not had any leakage around the stems.

We machined a groove in the bonnet to accommodate a neoprene "O" ring about  $\frac{1}{8}$ " in cross section, and selected a ring with right diameter to fit the groove, and about  $\frac{1}{16}$ " smaller inside than the shaft diameter.

By A. C. COPPEDGE  
Shift Engr., Utilities Dept.  
Lone Star Steel Co.  
Lone Star, Texas



## How Power Plant Operators Are Trained

**PROCUREMENT** of personnel with adequate background and potential to succeed in a particular job classification is the responsibility of the Personnel Section in most large companies today.

Training of personnel is a two-fold job. Indoctrination and training prior to going on the job is taken care of by the Training Section and First Line Supervision. The second phase of training is more important than most members of supervision realize. (i.e. The continuous aspect of keeping an operator up-to-date on the latest operating techniques and the whys of a good operating procedure.)

Power operating personnel at The Chemstrand Corporation's Pensacola Nylon Plant are experienced people with many years of operation behind them. The record was good. The need for continual operation was of paramount importance due to the nature of the nylon manufacturing process.

In early 1960, a study was made to determine what re-training of people needed to be done. The routine day to day function of operations was not considered to be the prime target. The reasoning behind the procedures seemed to be the most important thing in the minds of both operational personnel and management.

The most logical thing to do appeared to be a training program in basic sciences and discussion sessions on their applications to everyday operations.

A program was set up and is outlined in the accompanying tabulation.

The *Outside Operators* and the *Water Plant Operators* received training on functions one through nine with two additional weeks of on-the-job training. The *Boiler Turbine Operators* received training in all functions, i.e., one through eleven.

*Outside Operators* are responsible for operation of deep wells, cooling towers, sewage disposal

units and outside utility systems. *Water Plant Operators* are responsible for operation of the water treatment plant, degassifiers, water pumping systems and making chemical analyses of water samples. *Boiler Turbine Operators* are responsible for operating the boilers and auxiliaries, turbo generator units, air compressors, refrigeration machines and fire pumps.

In addition to the above training, plant safety policies, practices and procedures were discussed for one hour during the first three weeks of classroom work.

These classes consisted of four and five persons to a class, which gave the instructors ample time to discuss questions in the minds of the individual students. This re-

sulted in a much better understanding of the subject matter covered than is ordinarily the case in comparable training programs.

The final results of this program cannot be told for years to come. Immediate results were a better job knowledge and the resulting higher morale of operating personnel. Expected results are fewer operator errors, more attention to critical temperatures and pressures, fewer unscheduled shutdowns and reduced overall operating costs.

By G. P. DUNNAVANT, Results Engineer; and A. A. SPRAYBERRY, Dowtherm Engineer; Chemstrand Corp., Pensacola, Fla.

### OUTLINE OF TRAINING PROGRAM FOR PLANT OPERATORS

Function	Instructor	Time Spent
1. Area Review	Operation Supervisor	1 week
a. Field trips in area		
b. Class room discussion		
2. Elementary chemical and physical principles review	Results Engineer	3 days
3. Theory of Pumps	Results Engineer	2 days
4. Theory of Steam Turbines	Results Engineer	2 days
5. Theory of Air Compressors	Results Engineer	2 days
6. Theory of Refrigeration	Results Engineer	2 days
7. Piping, Valves and Fittings	Results Engineer	2 days
8. Water Plant Chemistry	Water Chemist	1 day
9. Economics, Review and Examination	Results Engineer	1 day
10. Steam Boilers	Operation Supervisor and Results Engineer	3 weeks
(a) Theory of Steam Generation, (b) Construction, (c) Auxiliaries, (d) Accessories, (e) Combustion.		
11. Alternating Current	Operation Supervisor	3 weeks
(a) Theory of electricity, (b) Switchgear, (c) Generation, (d) Distribution, (e) Electrical safety features.		



## **New Methods Cut Turbine Installation Time**

**NEW TECHNIQUES** using precision optical tooling and the latest in turbine-generator test facilities, have been combined to cut unit installation man-hour costs up to 34 per cent. Factory/field coordination from test pit to foundation results in absolute installation precision as well.

Steam chest, main stop valves, reheat control valves, oil tank assembly, and generator coolant and scavenging equipment can be completely tested as separate components and installed at the power station before major turbine and generator assemblies are delivered.

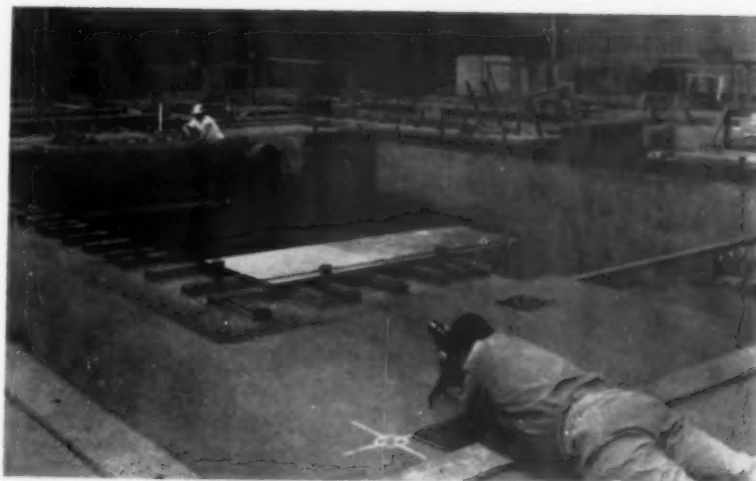
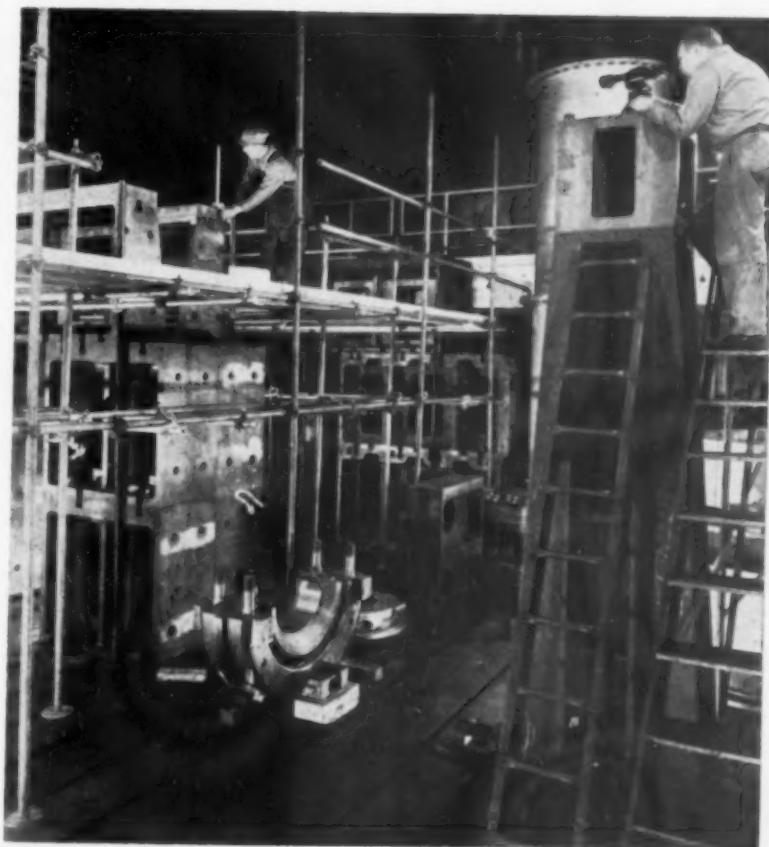
### **Precision Instruments**

Keys to this time-saving technique are modern turbine and generator manufacturing test facilities and precision optical alignment instruments. The turbine facility is factory assembled complete with integral steam, oil and condensing systems, as well as instrumentation and control apparatus. Therefore, piping systems and other below-floor equipment are not required for factory test runs.

Test pits also permit use of precise optical leveling equipment to establish a level reference plane from which factory assembly of the turbine takes place. With the same instruments, a corresponding plane can be established at the job-site foundation before major components arrive.

Installation engineers, using optical alignment methods and recorded clearances from the factory, reassemble the unit in the field as it was in the factory. Costly "cut and try" job-site adjustments are eliminated. The new time-saving technique is applicable for installation of all reheat type turbine-generators.

These techniques are discussed in considerable detail in an 8-page illustrated bulletin offered by Allis-Chalmers.



Optical leveling of modular test piers at factory (upper photo) and of sub-sole plates at job site (lower photo) to obtain the level reference planes on which Allis-Chalmers initially and finally assembles reheat steam turbine-generator units with great precision and speed.

# Using "Service Level"

## Helps Determine V-Belt Drive Economics

By **ROBERT N. BOGGS**

Application Engineer  
The Gates Rubber Company

**INFORMATION** used in the selection of V-belts is rarely published or cataloged in terms of belt life. Usually a belt catalog or design manual will show the horsepower ratings of belts in relation to the sheave diameter and shaft or belt speeds. This does not mean that life is not considered, but that the ratings are based on some "standard" life for all belts of a given type. In other words, if a belt transmits the specified horsepower under the stated conditions, it would last this "standard" life.

The "standard" for industrial type multiple V-belts is normally considered to be from three to five years. Until recently it was difficult to predict the actual life which might be expected from a specific drive. With information developed by The Gates Rubber Company, it is now possible to relate the drive conditions with service life through the computation of the "Service Level."

Service Level is usually expressed as a percentage. A 100% drive is one which corresponds exactly to the data in the manufacturer's catalog. This corresponds to the "standard" of industrial life discussed earlier. A 50% Service Level indicates that the drive will give one-half industrial service; a 200% drive, double the service, etc.

Obviously, the accuracy of the Service Level figure depends on the accuracy of the assumptions made of actual drive conditions as well as the presence of harmful environmental factors beyond the control of the designer. Such factors as peak intermittent loads, starting torque, etc., must be accurately appraised.

To illustrate the usefulness of Service Level in evaluating the

Sheaves	Belts	Initial Drive Cost	Replacement Belt Cost Per Set	Service Level	Belt Sets in 10 Yrs.	10 Yr. Cost	Avg. Cost Per Year
3-5V900	3-5V1250	\$105.35	\$46.35	33%	10	\$522.50	\$52.25
4-5V900	4-5V1250	\$133.80	\$61.80	200%	1.67	\$175.21	\$17.52

economics of two drive possibilities, let's set up a hypothetical situation involving a basic drive. Assume that both driver and driven sheaves operate at 1750 rpm and design horsepower figures out to be 60 hp. The belts are to be Super HC 5V1250's running on 9 inch O. D. sheaves.

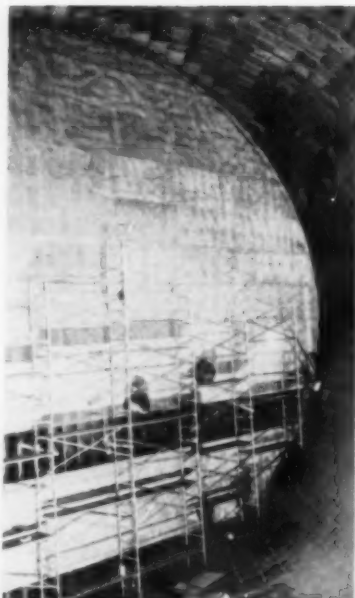
According to the catalog horsepower ratings, the drive requires 3.55 belts to carry 60 hp. By definition, 3.55 belts would give 100% Service Level. But the drive will have to use either 3 belts or 4 belts. Using Service Level calculations (Gates DH900, Pages 24 and 25) it is found that 3 belts give 33% Service Level and 4 belts,

200% Service Level. Which will give the most economical service over a ten year period? If we assume that 100% Service Level equals 3 years service, the comparison shown in the table may be made:

These figures show how costly it can be to skimp on a V-belt design. In this example, a "saving" of 21% on the original drive costs nearly three times as much as the 4-belt drive over a period of ten years.

Another important cost is not reflected in the above figures. The down-time required to change a set of belts may cost many times the value of the belts in terms of lost production and idle manpower.

## Safer and Cheaper . . . . .



**THE DIFFICULT** and costly problem of installing and maintaining diagonal filter screens and turning vanes at the right-angle turns of the propulsion wind tunnel, Aro Inc., Tullahoma, Tenn., is solved by use of aluminum scaffolds with adjustable legs. With legs set to conform to the varying slopes of the cylindrical tunnel shafts, the aluminum scaffolds are quickly assembled to cover the entire screen surface.

Tunnel diameters vary up to 55 ft. Upper portion of the scaffold in photo has been removed for installation on opposite side of filter screen. Compared with previous conventional platforms the rapidly assembled aluminum scaffolds reduced job costs from \$9,700 to \$6,500 for a saving of \$3,200 per installation. The scaffolds are manufactured by Up-Right Scaffolds.

# MANAGEMENT CLINIC

Conducted by ROBERT H. EMERICK, North Charleston, S. C.



## Automatic Operation Should Not Encourage Neglect

### Question . . . . .

**WE ARE MAKING** an intensive study of our plant operations with the objective of reducing production costs. An action we are considering very seriously is the replacement of two old boilers by a single, automatically fired and controlled package boiler.

The question is, can we eliminate all regular boiler room personnel since the new boiler will be entirely automatic in its operation?

### Suggestion . . . . .

**IN OUR OPINION**, for safety and money saving, at least one competent boiler operator is necessary. This man need not spend his working hours exclusively in supervising the boiler, but he should check conditions periodically and be available always on reasonable notice.

Here are the reasons behind our opinion:

1. The American Boiler Manufacturers Association declares officially:

"... Purchasers and users of automatically fired boiler units must recognize that competent supervision and adequate maintenance are required for safe and dependable operation. . . . Manufacturers of automatically fired boilers do not assume any liability for injury to persons or damage to property which may be attributed to the operation of the equipment."

Since "damage to property" includes damage to the unit itself, neglect or ignorance has the power to nullify the guarantee.

A second reason, a boiler room man who knows how to keep a log and compare daily records of fuel burned, water make-up, stack temperatures, etc., discovers promptly a falling off in performance that can be very expensive if not corrected. For example, with these comparisons, a drop of efficiency of 1 or 2% is readily noted, and the causes sought; but if nobody is there to carry on these studies, the condition may not be discovered at all.

And the cost? For a 200 hp boiler, a drop in efficiency of 2% can debit Management over \$1,000 a year in excess fuel. That's \$5 a year per boiler horsepower, and it's a very real hazard.

The daily log sheet also carries the schedule of maintenance steps to be taken when these steps come due. And somebody must be detailed the responsibility of doing what is needed, or an emergency shut-down is in the making. Obviously, maintenance is for a man who knows what he is doing, and all the automatic controls we have can't grind a valve or cut and fit a pipe.

Finally, we've never seen automatic operations that work perfectly always and forever. Some engineers actually, to illustrate informed feelings, provide *two* water level controllers on a steam boiler, just to be sure. We think one is enough — with a good man looking after the operation.

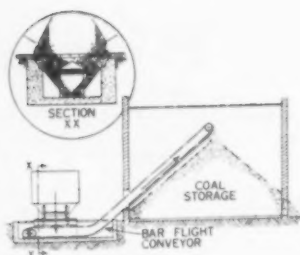


Figure 1

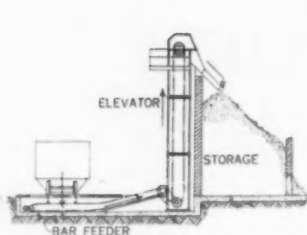


Figure 2

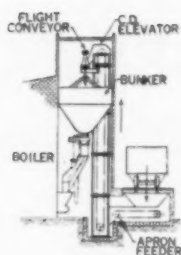


Figure 3

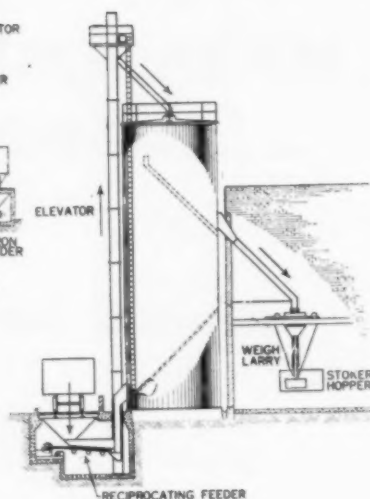


Figure 4

# Coal Handling

Abstracted from papers by FRANK W. LOVETT, Link-Belt Company and ARTHUR J. STOCK, Stock Equipment Company . . . Presented at the 1960 Industrial Coal Conference, Purdue University.

## Basic Systems — By Frank W. Lovett.

**THE DESIGN** considerations and operating characteristics of some basic coal handling systems are shown in the accompanying drawings.

Figure 1 shows a very simple type of coal unloading system, which is suitable for the small industrial plant. Coal is emptied from the car into a small hopper, whence a bar flight feeder performing both feeding and elevating functions conveys it to the storage pile, from which it is removed as required. The arrangement shown in Figure 2 serves the same purposes, but the bucket elevator permits a larger storage pile at a location closer to the track.

Figure 3 shows how coal is transferred to a bunker rather than to a storage pile. This arrangement is suitable for boiler houses of small or medium capacity. While the illustration shows an apron feeder below the track hopper, a reciprocating feeder or bar flight feeder may also be used. The elevator discharges to a flight conveyor or a screw conveyor for direct feeding to individual bunkers

or for distribution over a long bunker.

The system of Figure 4, with silo storage, is suitable for medium size plants. A drag conveyor feeds to the elevator, which conveys coal to a large storage compartment of the silo. Coal is drawn off from live storage through a spout to a weigh larry. Surplus coal is stored in the lower portion of the silo and reclaimed by the elevator.

Figure 5 shows a system built around a skip hoist. It is suitable for medium size plants and provides simplicity, requiring no feeding or distributing conveyors. A bulldozer moves coal into the track hopper, from whence it is conveyed by skip hoist to a storage bin.

A Peck carrier system as shown in Figure 6 provides great compactness, which is advantageous in very restricted locations. Coal is transferred by a reciprocating feeder from the track hopper to the Peck carrier, which conveys it to all points of the bunker.

The system of Figure 7 provides for coal delivered by truck. Coal is removed from the truck dump hopper by a bulk flow conveyor.

The bulk flow empties into a distributing conveyor, which feeds the bunkers.

Figure 8 shows a system which provides a high degree of compactness in medium to large plants by incorporating a gravity-discharge conveyor-elevator. Coal is removed from a track hopper by an apron feeder, which delivers it directly to the crusher. From there it is conveyed and distributed to the bunkers by the gravity-discharge conveyor-elevator.

Flexibility is provided for large plants by the system shown in Figure 9. Coal is removed from a track hopper by a feeder delivering to the bucket elevator. From the elevator, it may be discharged either to outside ground storage or to silo storage. Reclaiming from live storage in the lower portion of the silo is by a bulk flow conveyor, which conveys coal to the weighing scale. From the scale it is distributed to the individual stokers.

The belt conveyor system of Figure 10 is adaptable to large storage requirements. Coal is conveyed to the crusher by means of a belt conveyor, being fed from the track hoppers by a reciprocating feeder. From the crusher it can either be discharged to the ground storage or be transported by a belt conveyor to a bar flight conveyor, which in turn distributes it to the storage bins.

For the small plant handling



only a few cars of coal per week, a narrow, shallow track hopper is economical and adequate. Where the capacity is greater and both doors of the car are opened the hopper should be at least 14 feet square. To maintain greater capacities sufficient space should be provided vertically in the hopper to get the coal out of the car quickly and to provide storage in the hopper while the cars are being moved. A longer hopper would not provide this necessary additional storage economically. Where only one car is dumped at a time anything longer than a double 14 foot hopper is uneconomical.

Gratings over hoppers have been specified as low as 2" square. But six inch square openings are usually needed to provide safety and allow a reasonable flow of material. For large capacities, 10" open-

ings are generally used. Where bulldozers or carryalls are likely to pass over the grating, a heavy sub-frame with heavily reinforced cast steel gratings is recommended. Car shakers are now used extensively to assist in unloading wet screenings or bug dust and for increasing unloading capacities. A fair average capacity for a car shaker under most operating conditions is 6 to 8 cars per hour.

The foot end of the feeder below the track hopper should extend out into a covered pit for maintenance purposes as indicated in Figures 1 and 2. Especially when handling large quantities, variable speed drives on feeders have been found very desirable.

Direct connected reducer drives have, in the past, been preferable, but there is an ever increasing acceptance of high grade chain drive

between the reducer and the conveyor or elevator drive shaft. Finished steel roller chain drives are dependable and economical; they provide for more flexibility in the location of the reducer and motor, reducing the size of the drive platform or conveyor gallery, and allow for a possible change in conveyor speed with minimum effort.

Hoppers and transfer chutes should be provided with liberal inspection doors. So far, belt scrapers using  $\frac{1}{2}$ " to 1" pure rubber wipers have given the best overall results. Scrapers should always be accessible. Ball and roller bearings reduce maintenance expense at relatively low additional initial cost.

It is common practice to specify and furnish spare parts for a material handling system. Duplications of such things as shafts, bear-

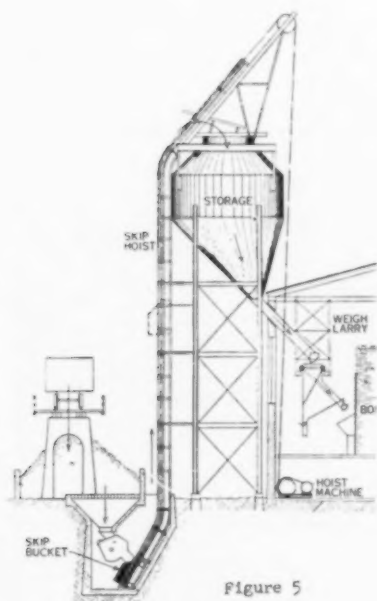


Figure 5

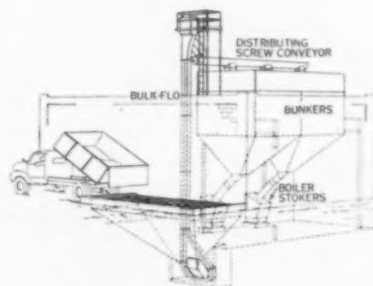


Figure 7

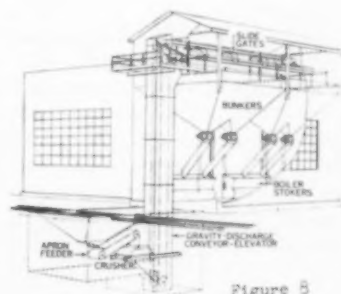


Figure 8

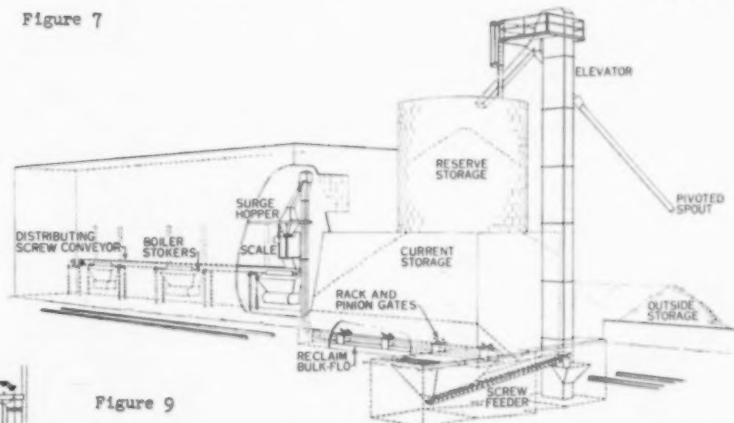


Figure 9

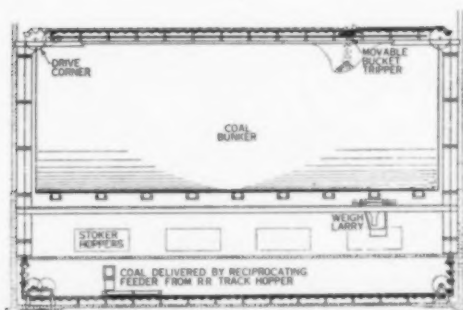


Figure 6

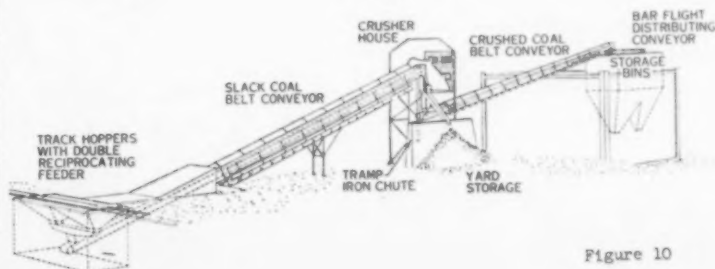
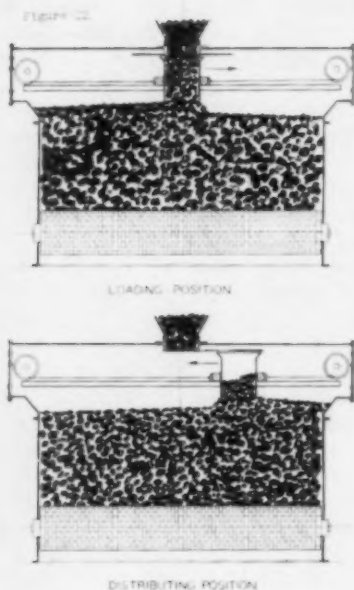
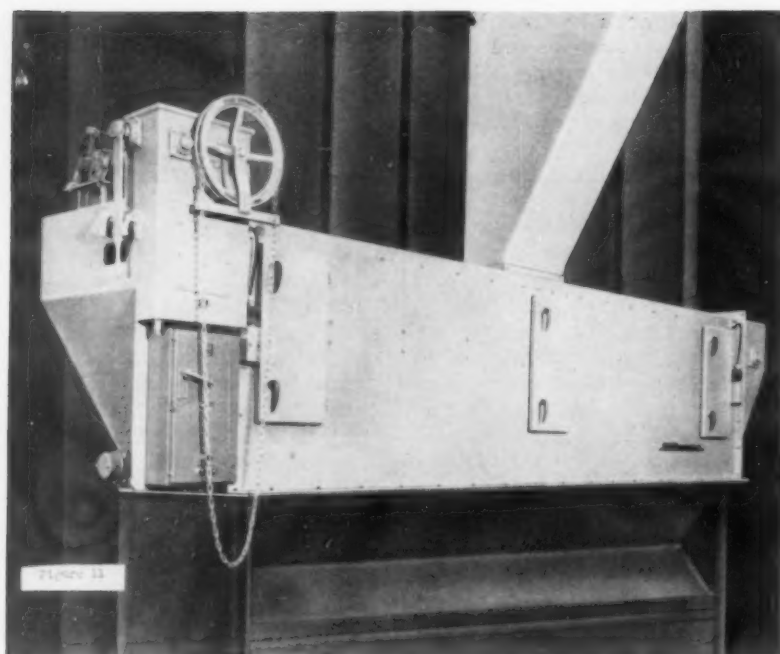


Figure 10



ings, reducers, motors and other parts subject to damage are to the advantage of the operator at relatively low additional cost. A chain drive gives opportunity for duplication of reducers within groups. If intelligently grouped, the additional cost of certain oversize drives and terminals should not be excessive.

#### Space and Accessibility

There is always the effort to make pits as shallow and small as possible which, of course, is commendable. However, a sacrifice of space may result in aggravated operating and maintenance problems. Often a track hopper pit is a place where squeezing and stooping and ducking is the only way one may get around, and certainly maintenance and cleanup is going to suffer in such a pit.

A 14 foot wide track hopper not only receives coal from the car with minimum clean-up, but the pit required for it gives enough space to get around a feeder or a transfer. A few eyebolts cast into the concrete roof of a pit provide something for the erecting or maintenance crew to hook onto. A few well spaced steel inserts set into the concrete walls will provide a means for welding auxiliary platform beams and supports.

Space should be allowed around

an elevator boot for clean-out and repairs. Transfer points should have platforms conveniently located so that bearings, reducers, motors, etc., are readily accessible. Platforms should be sturdy and take into consideration the moving of a motor or reducer. Trolley beams located over conveyor terminals, crushers, screens, etc., provide for erection and repairs.

A correctly designed belt conveyor will not operate successfully with crowded and flattened chutes, nor an elevator that is fed too low or discharged too high. Means certainly should be provided to remove drainage from pits and other low spots.

Expanded metal guards over

open belt conveyor pulleys, hand railings, guards on long inclined belt conveyors handling large lumps that may roll back, expanded metal guards around vertical gravity take-ups are some of the items that should be included in a modern power house.

#### Maintenance

The successful and uninterrupted operation of mechanical equipment of any kind necessitates a high standard of maintenance and a system of regular inspections to detect the first sign of critical wear or failure of any parts due to: lack of good housekeeping, lack of lubrication, lack of timely adjustment of parts, and normal wear.

### Bunker to Stoker & Pulverizer Systems — By Arthur J. Stock.

**THE EQUIPMENT** which forms the connection from the bunker or silo to the firing equipment in a boiler house has characteristic problems of its own.

#### Coal Segregation

Coal segregation in boiler plants is a cause of fuel waste and increased maintenance, and it limits maximum steam output. Whenever coal is moved, there is a tendency to separate the coarse from the

finer unless suitable care is taken. Coal may become segregated as it is supplied into the bunker, and this segregation may continue right through the bunker-to-stoker equipment with resulting poor firing conditions. Segregation in an outside coal storage pile can be particularly hazardous because the veins of coarser material can form air passages which promote fires.

The methods of combating segregation are numerous. However,

there is one fairly new device which is worthy of mention. This is the layer loader, shown in Figures 11 and 12. Basically the layer loader is the equivalent of a swinging spout except that only the lower end of the spout is employed. This lower end becomes a bottomless car which is driven back and forth above the stoker hopper. Coal feeds into the car through an automatic coal valve when the car is in its mid position. As the car moves away from the mid position the valve closes and coal in it is distributed.

Advantages of the layer loader are its low headroom requirement and dust-tight construction. Like the swinging spout, it provides a continuous mixing action of the coal.

#### Dust-Tight and Automatic

The bunker-to-stoker or bunker-to-pulverizer equipment of a modern power house should be dust-tight, fairly automatic, and largely controlled from the boiler control panel.

An underbunker conveyor installed between a bunker and the

point of use of the coal, frequently provides a method to eliminate a weigh larry.

Figures 13 and 14 show an example. In Figure 13, a two ton weigh larry supplied boilers on either side of the central firing aisle from a 500 ton suspended bunker at one end. With the installation of four 125 ton top-suspended bunkers and the two underbunker conveyors shown in Figure 14, it became possible to feed any pulverizer from any hopper outlet in the same row.

Figure 15 shows the basic components of an underbunker conveyor. Coal is received from any of the bunker outlets through intermediate valves and triple valves. A triple valve is actually three valves in one. It is possible to feed coal directly by gravity from the bunker outlet to the coal scale and stoker below. It is possible to feed coal into the underbunker conveyor for use at some other point. Finally, it is possible to take coal from the underbunker conveyor and burn it at this point in lieu of gravity coal.

The five basic purposes of an

underbunker conveyor are as follows:

1. To feed coal to stokers or pulverizers which are so located in relation to the bunker outlets that coal cannot be fed to them by gravity.
2. To reclaim coal from the dead spots which exist between the principal bunker outlets.
3. To reduce the frequency of coal loading operations.
4. To empty quickly and easily any section of the bunker for repairs or the prevention of bunker fires.
5. To make possible the operation of the boiler plant for the maximum number of hours in the event of a breakdown of the equipment which elevates and conveys coal to the bunker.

There is another way of feeding to stokers in those plants which have a single source of coal, such as a silo, located at one end of the firing aisle. This is the use of a non-segregating stoker feeder, as shown in Figure 16. Coal is transported by a larry car which operates inside a dust-tight housing or "tunnel" above the stoker hop-

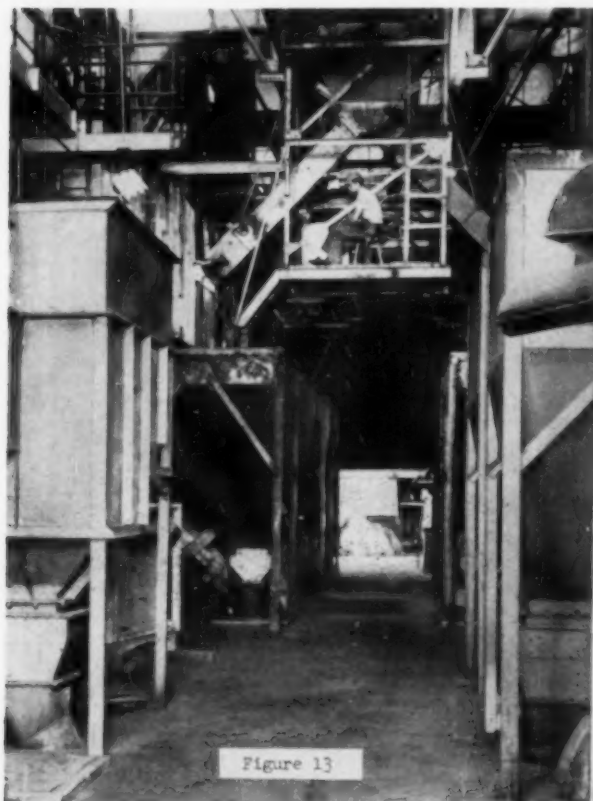


Figure 13

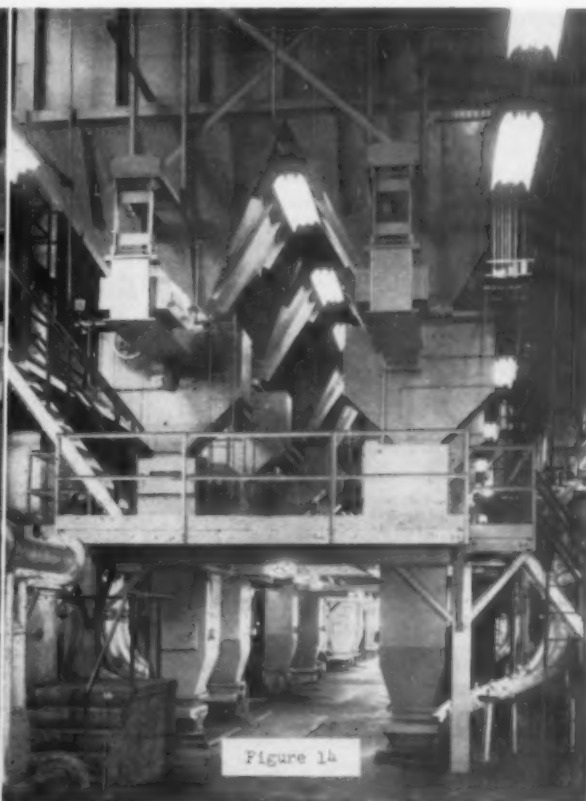


Figure 14

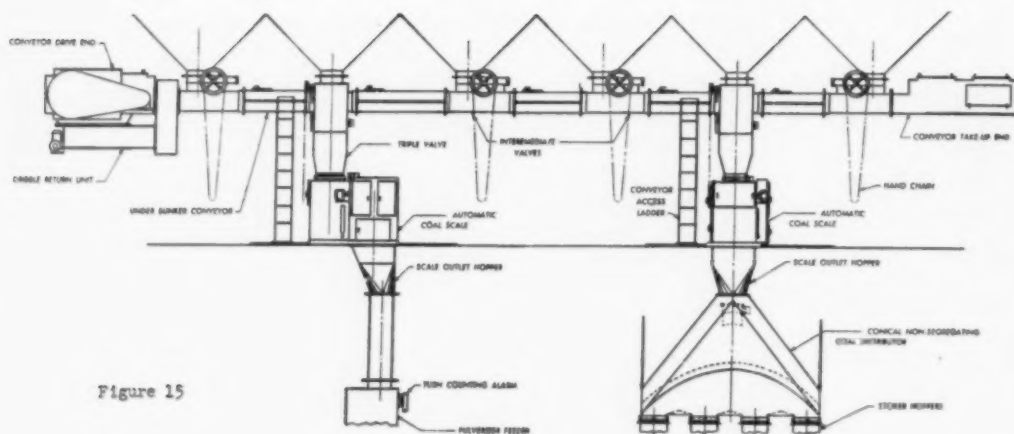


Figure 15

pers. The coal is discharged from the larry car into extensions above the stoker hoppers for each boiler. The larry car receives coal from the weigh hopper of an automatic coal scale.

Each of the stoker hopper extensions is divided into sections so that no segregation can occur across the length of the stoker. Each of the compartments is fitted with a paddle type level indicating device. Any time the coal level in one of the compartments falls below the normal value, one round trip of the larry car is started. The car transports the coal from beneath the coal scale to the compartment in question, discharges, returns to its starting point beneath the coal scale, and receives another weighed batch of coal. The weight is integrated separately for each boiler.

### Corrosion

It is very difficult to say in advance exactly what the best material will be for a particular application. Generally the corrosive conditions can be expected to be more severe with higher sulfur and moisture contents, but this is by no means always the case. In a pit storing fairly wet coal,  $\frac{3}{8}$ " thick mild steel corroded through in a 60 day period, and a  $\frac{3}{8}$ " thickness of cast iron in an adjacent part went through in 90 days.

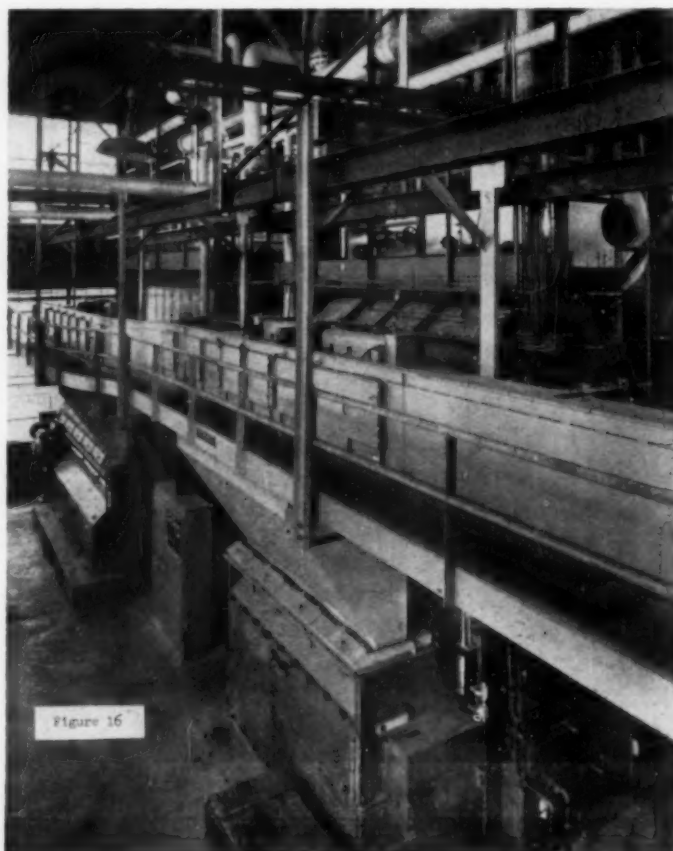
Figure 17 shows the approximate prices in Cleveland, Ohio, of  $\frac{3}{8}$ " thick plate in various types of steel. Since the cost of fabricating these steels does not vary nearly so much as the material cost, the

spread in prices of finished chutes, hoppers, and other equipment is much less than might otherwise be concluded.

Cor-Ten steel is an alloy steel containing some copper. It can be field fabricated with essentially the same ease as mild steel. Its corrosion resistance is supposedly somewhat better than mild steel. However, there is doubt as to

whether it is sufficiently better than mild steel for coal handling chutes and hoppers to justify even the slightly higher price.

Solid type 410 stainless steel is generally to be recommended for bunker to stoker equipment where corrosive conditions are indicated. This alloy contains 12% to 13% chromium and no nickel. As with the other stainless alloys and stain-





Dialogue:—Vice President to Power Plant

## UNSCHEDULED DOWNTIME!



*V. P.—“What’s going on out there in the power plant?” / P. P.—“Have to replace some equipment. Corrosion trouble.” / V. P.—“How long will production be down?” / P. P.—“Hard to say... perhaps a week.” / V. P.—“Whzxtspyvoz!?! Do you know this downtime is costing the company \$50.00 a minute? How do you expect us to fill orders?” / P. P.—“Sorry... but—” / V. P.—“Never mind being sorry! Get some experienced water treatment and control engineering firm in there—and HURRY!”*

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Figure 18

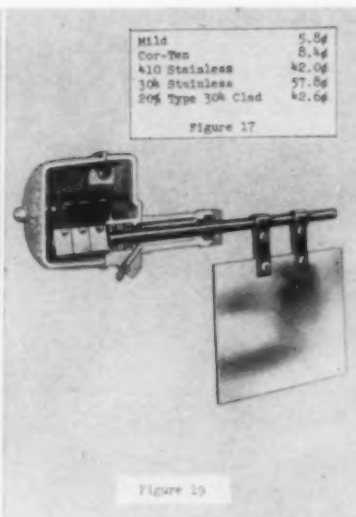


Figure 19



Figure 20



Figure 21

less clad materials, it is difficult to cut in the field, but otherwise is not difficult to fabricate.

Type 304 stainless, which is an 18-8 alloy, and other stainless alloys of the 300 series definitely have corrosion resistance superior to the 400 series alloys. However the additional life, if any, to be expected from type 304 stainless for applications with coal is sufficient to justify the additional cost of the material only under unusual circumstances.

There is considerable talk about the stainless clad materials. As simple plates before fabrication, they are from 15% to 25% less expensive than the corresponding stainless in a solid plate of the same total thickness. However, the stainless clad materials are considerably more difficult to fabricate. Also, the basic conditions for which stainless clad is intended, namely a corrosive condition on one surface plus a stress condition requiring a heavy total plate thickness, are not present in typical bunker to stoker equipment.

#### Indicators and Alarms

There are many types of devices used to indicate the level of coal in bunkers, hoppers, and bins, or to give an alarm if coal is present or absent. Most of the difficulties encountered with such equipment can be traced to the use of an indicating device which is too light for the application or which is improperly located in the bin or hopper. However, here is a word of

caution: in spite of an understanding why a particular device is not working completely satisfactorily, there is frequently no easy alternate solution.

One of the more common types of coal indicating devices is the ball type, Figure 18. It is compact and easily installed at the end of the conduit that carries the electrical leads. The ball is supported on a gimbal ring which allows the ball to be pushed in any direction and actuate the small limit switch. A flexible rubber diaphragm prevents coal dust from getting into the device.

The paddle type is shown in Figure 19. Homemade designs of this type have been constructed for many years, but frequently have been unsuccessful because of the difficulty of assuring reliable operation of the bearings in the coal atmosphere. Modern commercial types are reliable because of proper seals for the bearings. The device operates by deflection of the paddle by the coal, in turn rotating cams which operate the small limit switches.

An electronic type of level indicating device is shown in Figure 20. As with the majority of electronic types, this unit is sensitive to changes in electrical capacity in the vicinity of the probe. The control unit is contained in a separate housing which may be located up to 300 feet away from the probe. As with any electronic device, vibration at the control chassis should be avoided and a regular

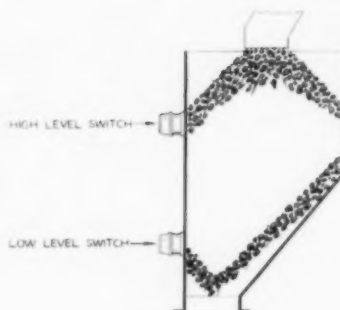


Figure 22

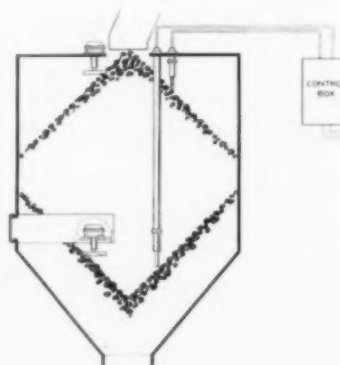


Figure 23

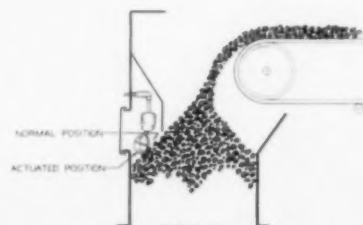


Figure 24

from **Yarnall-Waring Company, Philadelphia 18, Pa.**  
ATLANTA OFFICE: 453 IVEY BUILDING, 3330 PEACHTREE ROAD, ATLANTA 3, GEORGIA

## HOW YOU CAN SAVE MAINTENANCE...INCREASE OPERATIONAL TIME WITH YARWAY COLOR-PORT GAGES

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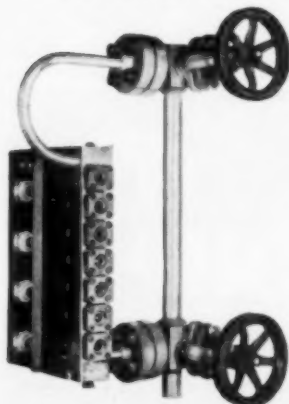
These Color-Port features will help you do the job:

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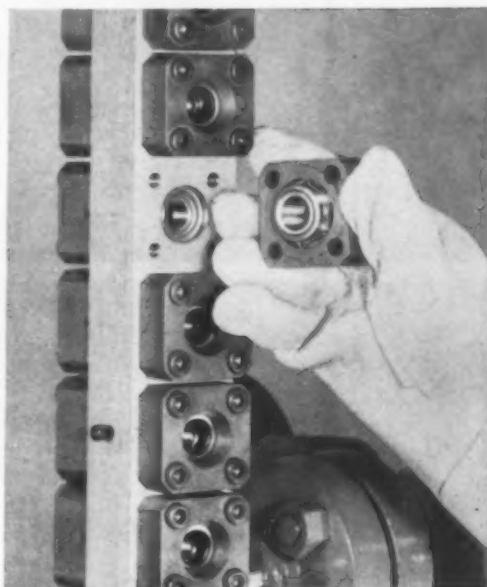
These benefits, PLUS brilliant two-color readings (water space shows green; steam space shows red), PLUS Yarway quality—make COLOR-PORT your best gage buy! Available for all pressures from 0 to 3000 psi maximum.

Write for Yarway Bulletin WG-1815.

### NEW COMPACT DESIGN WITH "WELBLOC" VALVES SAVES INSTALLATION SPACE

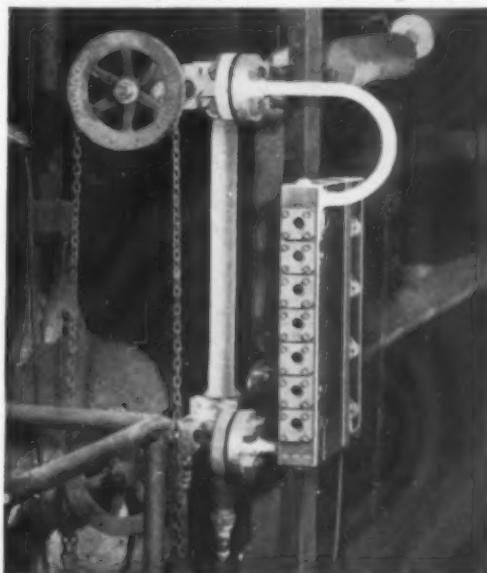


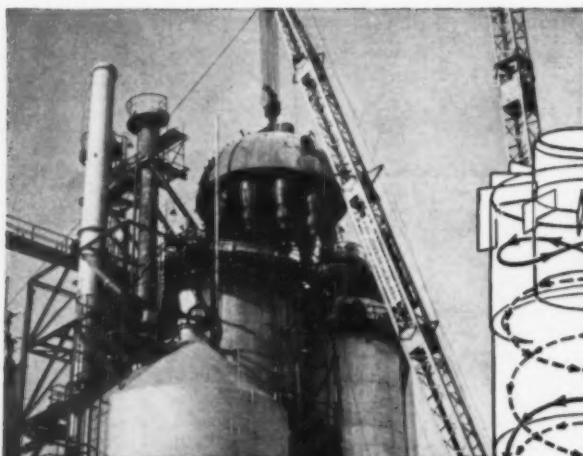
New "Welbloc" valves on Yarway Color-Port Gages reduce installation space requirements up to 40%. All working parts of valves are easily accessible. Improved direct flow from boiler drum to gage, reduces temperature differential.



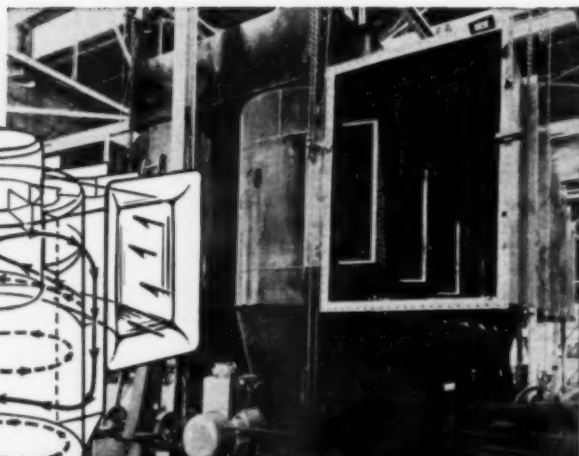
*Servicing the Yarway Color-Port Gage is simple! Just remove 4 cap screws (no need for torque wrench), place new "package" assembly in cover, and replace cover assembly. A matter of two or three minutes.*

Yarway Color-Port Gage installed on boiler at Alan Wood Steel Co. Leading industrial plants all over the country as well as many major utilities are among the hundreds of satisfied Color-Port Gage users.



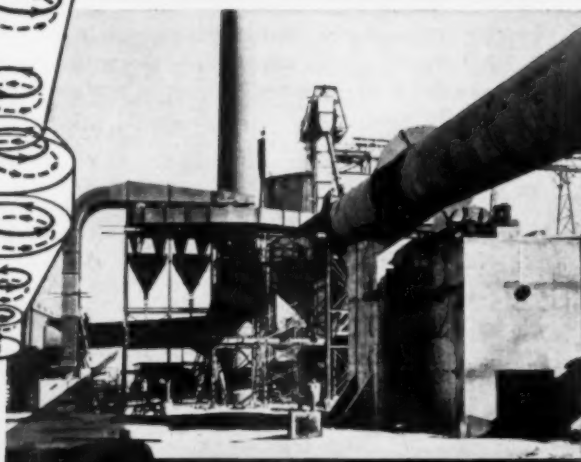
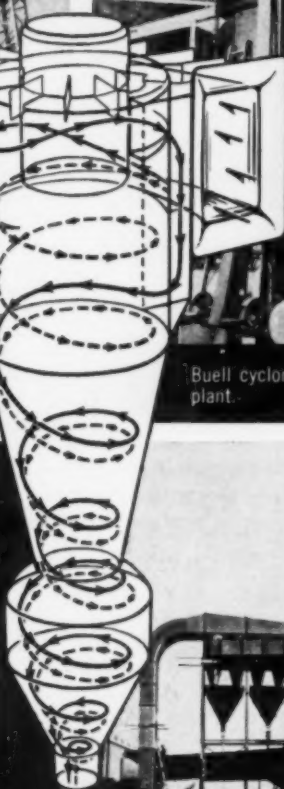


Buell catalyst recovery cyclones being lowered into regenerator unit at a large refinery.



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maintenance schedule for the tubes is a must. The device is available to give a "fail safe" condition of either an open or a closed circuit in the event of electric power failure.

The most important and least appreciated condition involved in the use of level indicating switches is their location. Figure 21 shows high and low level diaphragm type switches correctly installed on a bin. Note that these switches are located on a vertical side wall adjacent to the outlet, permitting best possible coal flow away from the switches. The high level switch is located so it can be completely covered by coal at the high level point, and the low level switch is correspondingly located so it can be completely uncovered at the low level.

Figure 22 shows both a rotating type switch and an electronic switch, again used to indicate high and low level in a bin, but this time with a center inlet and outlet. Note that the switches are located as near the active coal flow in the center of the bin as possible. Both of the low level switches are in a position which is difficult to service, but they will perform more satisfactorily than if they were located close to the outside shell.

There is also the disadvantage that the doghouse for the rotating switch may itself act as an obstacle to flow, and the long support for the electronic probe may be subject to damage if the coal avalanches down the pile. However, these disadvantages are inherent with any low level indicating device in a bin of this design.

Figure 23 shows a ball type switch as a transfer point. Note that a baffle is provided to prevent stray pieces of coal from knocking the ball and creating an erroneous indication. It is preferable that the chute below the switch continue vertically downward or to the left to reduce the possibility of coal build-up and false alarms. Switches located at such transfer points are usually employed to stop the coal conveying equipment ahead of the switch in the event the equipment below the switch fails to remove the coal from the transfer hopper. Such switches are extremely important because of the

tremendous quantities handled by modern belt conveyors.

The above comments on design and operating problems of bunker to stoker and related equipment should be considered as merely indicative of the factors involved and by no means conclusive. Each individual operating problem must be considered on its own merits, for what is eminently successful for one installation at one time may fail elsewhere.

*Another paper presented at the same meeting with the two papers abstracted above is on the subject of Ash Handling.*

## POWERFUL CARLA

**THE POWER** generated by a hurricane like Carla is almost beyond the grasp of man's mind.

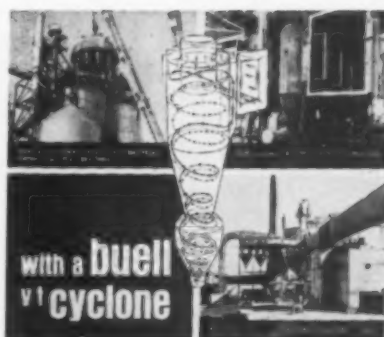
Some vision of a hurricane's awesome force is outlined by some computations by Andrew Moore, Central Louisiana Electric Company's chief electrical engineer, who has also studied meteorology at New York University.

Mr. Moore estimates that Carla generated enough power to meet CLECO's electric production needs for 8,000 years! The utility's two power stations have a capacity of 315,000 kilowatts that can generate 800 million kilowatt hours annually.

Without going into the intricate details of this computation, Mr. Moore said he produced the 8,000 years figure based on Carla's eye diameter and 10 inches of rain in a 24-hour period.

The eye of the hurricane is sharply defined and it is indeed a calm area that may be bathed in sunshine and clear skies. Also there may be a great concentration of birds that have been forced into the area by the screaming winds outside the eye.

The inner edge of the hurricane, which may terminate a 12 to 60 mile stifling center of stillness, is where the winds begin to screech counter clockwise in speeds up to 200 miles an hour or more.



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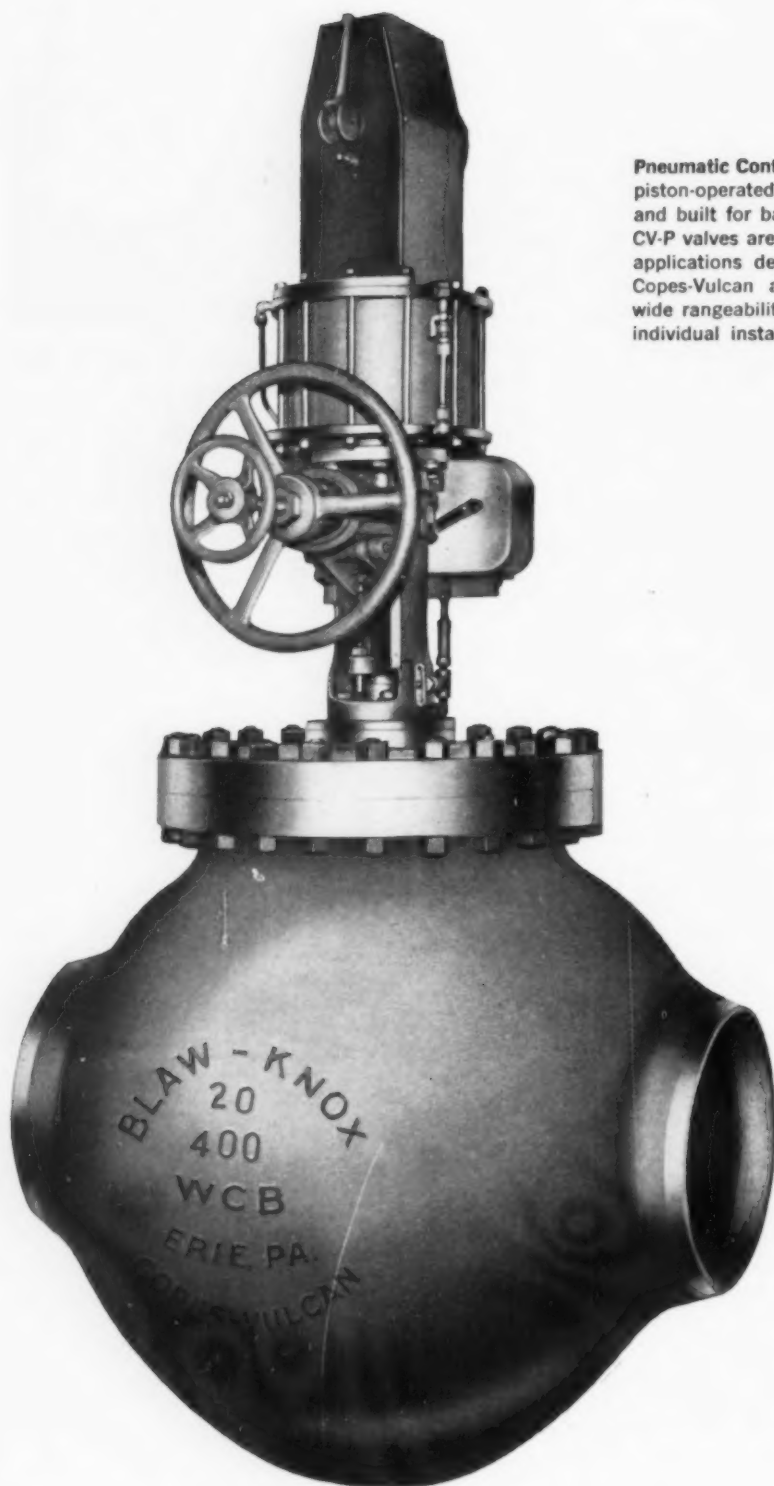
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**Hydraulic Control Valves**—This 600-psig hydraulically-operated control valve, with 16-inch inlet, 20-inch outlet and 2½-inch stroke was designed and built for steam-dump in 80 milliseconds and precise back-pressure control. Copes-Vulcan offers valves in sizes up to 20-inch, and in pressure standards up to 2500-psig. They may be single- or double-seated. They can handle pressure drops up to 2000 psig.



**Nuclear Valves**—This 6-inch, 1500-psig motor-operated three-way selector valve for use in a stationary nuclear power plant was built of stainless steel for primary-fluid relief service. The unique design reflects the engineering capability offered by Copes-Vulcan for the solution of the most difficult problems encountered in both nuclear and conventional power stations.

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Copes-Vulcan offers equipment and control systems for boiler cleaning, combustion, feedwater, desuperheating, pressure reducing, and superheat and re-heat steam temperatures. Each is available separately, or as an integral part of a single control package, custom-engineered to meet individual needs.

Copes-Vulcan also offers special valves for applications in conventional and nuclear power plants on land and sea. Like all Copes-Vulcan products, they are backed by experience gained in serving the power industry for more than half a century. Copes-Vulcan Division, Erie 4, Pennsylvania.

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## **Injunction Upholds State Sovereignty**

**A DECREE** permanently enjoining the Withlacoochee River Electric Cooperative from serving two customers in Pasco County that had previously been served by Tampa Electric Company has been issued by Judge Charles Phillips of the Circuit Court of the Sixth Judicial Circuit.

Judge Phillips' decree came as the result of two days of hearings in Dade City, after the case had been remanded for further proceedings in line with the Florida Supreme Court's decision. And, as a result of litigation in Florida Courts by the investor-owned utility and the REA co-op for the better part of the last three years.

In his decision, Judge Phillips reminded the Court of the primary purpose for which REA co-ops were originally established and pointed out that, in his opinion, due to the Florida Supreme Court's philosophy regarding co-ops that Tampa Electric had the "pre-emptive right" to serve customers in areas where lines of the two firms were adjacent.

It was shown that the co-op had violated the Florida Statute which prevents such organizations from serving any customer receiving adequate central station service. Judge Phillips stated that in this case service was available from Tampa Electric "not remotely but immediately adjacent to the place to be served."

### **Defines Co-op Purpose**

The Clearwater court official went further in his opinion of electric co-ops and the nature of their operation as defined by the Florida Statutes: "The rural electrification program was a stop-gap, a crash program, if you please, and that as a part of that program

there is a conscious and planned program of anticipated attrition. In other words, as an area becomes more urbanized, as certainly this area is, it is within the scope of that philosophy that eventually there would be no rural electric cooperative."

"We have to look at the time and the situation in which rural electric cooperatives were started," Judge Phillips continued, "not only in this area but in all areas. They had several governmental purposes to serve. Some of these purposes were economic, some of them were social. But the mere fact of creation does not, so long as that creation is for a specific purpose, necessarily mean that some program that has been created must always exist."

The Judge went on to point out that after such co-ops had fulfilled their social and governmental obligations, they should then be required to operate as private industry or under the same regulations.

"It may well be that in the future these rural electric cooperatives will be converted to regular private industries on an equal basis with other private industry. Certainly if the philosophy is to give private industry the pre-emption, as it appears to be from our Florida statutes, then these facilities may at some time in the future be acquired by private industry.

"Again," he continued, "it may be an indication of urbanization that there are private industries now in this county which are willing to come in and serve customers."

### **Upholds State Sovereignty**

Earlier in the proceedings of the two-day hearing that preceded the issuance of the permanent injunc-

tion against the Withlacoochee River Electric Co-op, Judge Phillips pointed out "that different conclusions" might result from the trial of this case in Federal Courts. He stated that he was of the opinion, however, that the "initial sovereignty" in the case rests in Florida.

"I feel that the initial sovereignty rests in the State of Florida and that the Federal government has only delegated sovereignty; that while the Federal government may exercise control over portions of the rural electrification organization, such as financing and criteria for financing, that still we have statutes in the State of Florida that govern us, which statutes have not yet been found to be unconstitutional. Accordingly, we are bound by these statutes."

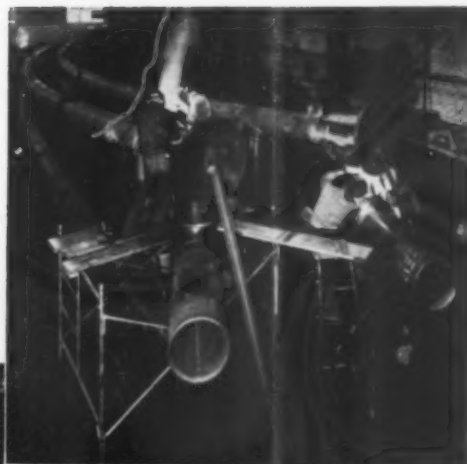
In reply to Withlacoochee counsel's question: "What if the Co-op is adjacent to a property and the Tampa Electric Company, after the Co-op has already been there, moves into the property so that their line is available and adjacent, what is the situation there?"

Judge Phillips replied: "It depends upon whether or not the Tampa Electric Company line, before the extension to reach that customer, was available within a reasonable interpretation of the word 'available.' If it were a hundred feet from being adjacent, I think Tampa Electric should have the customer. If it were a mile away from the property on the east and the Co-op was adjacent on the west, I think the Co-op should serve."

The Judge, however, urged both the Tampa investor-owned utility and the REA Co-op not to extend their lines "in any awkward or unbalanced fashion to try to pre-empt customers."



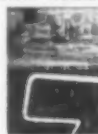
# Self-supporting pipe arch carries gas at 880 psi over 150-foot span



Midwest shop-fabricated this self-supporting river-crossing arch which was installed in a single day by Laclede Gas Company of St. Louis. Formed by converging pair of 16" pipes, the arch is the only one of its kind in the country.

Structurally a compressive member (except for lateral loadings), the arch becomes a tension member when acting as the carrier pipe for gas under high pressure. Allowance had to be made for a five-foot difference in elevation at the ends of the arch. No expansion joints were required for the arch, since it acts as its own expansion loop. This unusual river-crossing arch is capable of carrying 200 million cubic feet of gas daily at 880 psi.

For complete information on Midwest Piping's products and services, write for Bulletin 60B; POWER AND PROCESS PIPING.



## MIDWEST PIPING

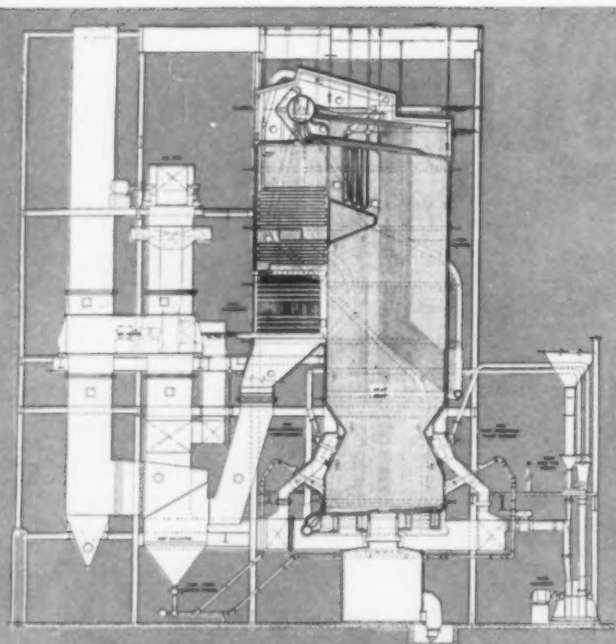
A Division of Crane Co. 1450 South Second St. • St. Louis 4, Missouri

# RILEY TURBO FURNACE

## ...Has Appetite

These four industrial type Riley Turbo Furnace Boiler installations demonstrate the exceptional ability of this exclusive Riley furnace design to utilize a wide variety of fuels.

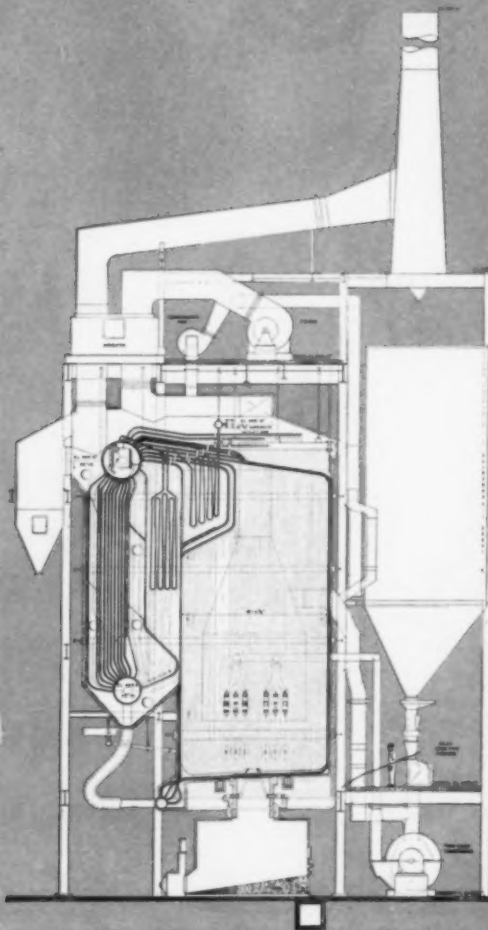
The Turbo Furnace design efficiently utilizes waterwall surfaces producing rapid and uniform natural water and steam circulation. Uniform gas distribution produces minimum variation in superheater temperatures. Absence of excessive wall deposits reduces need for wall blowers.



### PULVERIZED COAL

These two Riley Turbo Furnace Boilers for two large chemical companies each will fire coal pulverized by Riley 550 Pulverizers. The 650,000 lb/hr Turbo Furnace unit (above) is designed for a pressure of 1400 psig and a steam temperature of 900 F. Coal is pulverized by five Riley 550 pulverizers. Operating efficiency is 89.2%.

The Turbo Furnace Boiler at right is designed with a steam capacity of 150,000 lb/hr at a pressure of 700 psig and a temperature of 760 F. Fired by two Riley 550 Pulverizers.



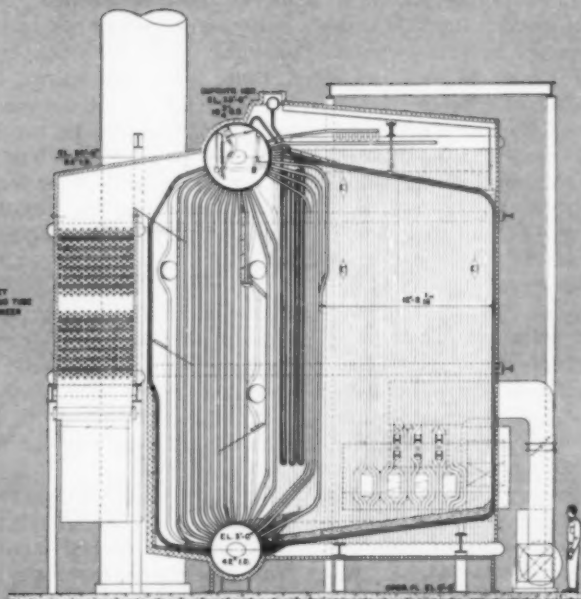
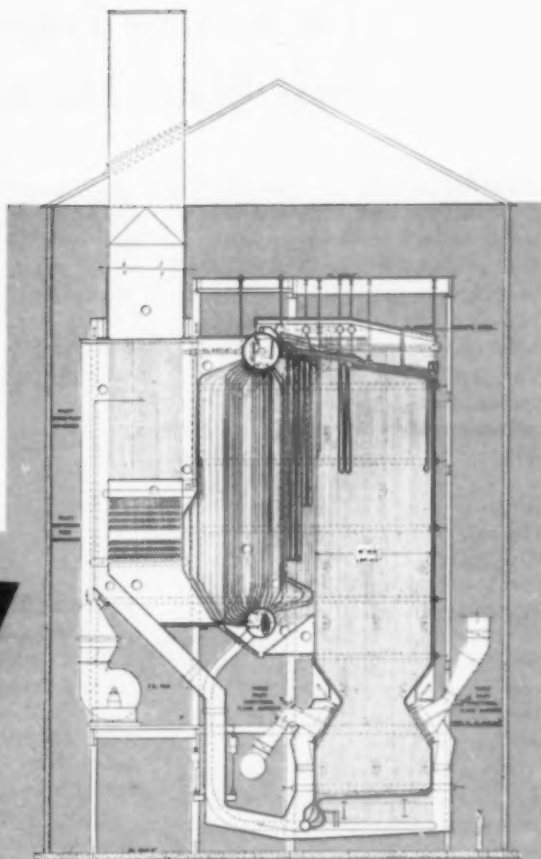
# for Many Fuels

Carbon loss and flyash are kept to a minimum. Steam temperatures are maintained over a wide load range. Burners on one level make supervision easy and automatic operation convenient.

For further details about the unusual fuel burning capability of the Riley Turbo Furnace call your Riley representative or write direct to **RILEY STOKER CORPORATION**, Worcester, Massachusetts.

## BLAST FURNACE GAS, OIL

A prominent steel producer is using this 350,000 lb/hr Riley Turbo Furnace boiler to burn blast furnace gas and oil. The unit is designed for a pressure of 975 psig with a steam temperature of 850 F and at an efficiency rating of 78.5%. The furnace is also pressurized.



## CO GAS, GAS AND FUTURE OIL

Riley Turbo Furnace boiler unit for a Texas refinery will fire natural gas at 75,000 lbs/hr and at 50,000 lbs/hr capacity will fire catalytic flue gases which will help to reduce atmospheric pollution. The unit is designed for 450 psig and 650 F.

For Complete Details About Riley Boilers Write **RILEY STOKER CORPORATION, WORCESTER, MASSACHUSETTS**

**Sales Offices:** Boston, Charlotte, Chicago, Cincinnati, Cleveland, Denver, Detroit, Honolulu, Jacksonville, Kansas City, Los Angeles, New Orleans, New York, Philadelphia, Pittsburgh, Portland, Salt Lake City, San Francisco, St. Louis, St. Paul, Seattle, Syracuse.



# RILEY

**STEAM GENERATING & FUEL BURNING EQUIPMENT**

# Conservation Program Ends Water Shortage

**CONSERVATION** of natural resources and purchased raw materials is a must for any industrial plant that expects to compete in today's highly competitive markets.

In early 1960, The Chemstrand Corporation's Nylon Plant in Pensacola, Florida, was faced with a severe well water problem. The answer to this problem appeared to be the purchase of additional property and the installation of two new wells at considerable cost. The high cost of the new equipment was due to salt water encroachment in the well field aquifer. This would necessitate purchasing property away from the nearby river, installation of long power transmission lines and additional water mains.

A survey of water usage at the Pensacola Plant brought out the following facts:

1. Relatively few people tried to conserve water.
2. Re-use of water could provide important savings.
3. Domestic use of water for urinals, etc., could be reduced without sacrifice of good sanitary conditions.
4. Use of improper amounts of water for manufacturing processes. The old adage "if a little will do a good job, a lot will do a better one" is not necessarily true.

Interested personnel were called in to discuss the findings and to plot a course of action to eliminate the need for additional water wells. A water conservation program was started. It was to be a four step program.

1. Conserve water by readjusting urinals, repairing leaky faucets, etc.
2. Use of basic water requirements in manufacturing processes.
  - (a) Preventing uncontrolled losses.
  - (b) Reducing steam leaks.
3. Re-use of water wherever possible. This included condensate used as cooling tower make-up, air conditioning water used as make-

up, air wash water used as cooling tower make-up and cooling tower and river water in lieu of treated well water in several heat exchangers.

4. A continued effort to keep all personnel aware of the need to conserve water at all times.

The use of this water conservation program has resulted in a net saving in well water usage of approximately 2000 gpm and eliminated the need for additional equipment. This is an important saving to the company and is certainly in step with conservation of the natural resources of the state and nation.

*By G. P. DUNNAVANT, Results Engineer; and M. E. BATZ, Senior Water Chemist; Chemstrand Corp., Pensacola, Fla.*

## TV Serves as Private Eye

**PITTSBURGH** Plate Glass Company's Chemical Division at Lake Charles, La., has installed a custom-designed closed circuit television and electronic gate system here to provide remote surveillance and regulation of an entrance to a critical plant area.

The system's camera, mounted on a special pole 40 feet from the gate, is operated remotely from a custom built control unit in the guardhouse a quarter of a mile away. PPG designed and engineered the control console.

The General Electric TE-6-B industrial TV camera has a zoom lens for maximum viewing range, heater, defroster and a weather-proof housing with a window wiper for wet weather. The closed circuit equipment was furnished by G-E through its Dallas agent, Mobile Radio Service Company.

The television monitor is adjacent to the custom control console, which includes an inter-communication system and remote provisions for opening and closing the gate and operating the lens, wiper, defroster, heater and floodlights which illuminate the gate area.

All parts of the electronic gate operation are controlled over special telephone-type multi-cable.

Mounted immediately under the camera are three 300-watt spotlights for nighttime use. They are panned automatically with the camera turned from side to side.

The camera, accessories and spotlights are easily accessible for

maintenance from a special platform built on the camera mount.

During nighttime hours, the area also is illuminated by four 1000-watt floodlights mounted on two poles and beamed toward the gate.

Mounted on the gate, the intercom is equipped with a push-button for buzzing the guardhouse. A driver can talk through the intercom to the guardhouse while remaining inside his truck or car.

Since the remote control console gives the guard full and immediate control of the gate, he can open it partially for a pedestrian to pass or all the way to allow a vehicle to enter. The guard can stop the gate automatically at any time and close it.

The camera is so positioned that it also provides the guards with a clear picture of the inside area immediately around the gate. Therefore, the guard can regulate the opening and closing of the gate for persons and vehicles leaving the critical plant area.

Use of the closed circuit system allows control of the gate to remain in the central guardhouse. This gives better insurance against unauthorized persons entering this closed area.

At the same time, it has allowed PPG's present guard force to provide security for an entire new area. And the system can be expanded easily to provide central control of additional entrances to restricted and critical areas.



**Coming in DECEMBER  
Southern Power & Industry  
THERMAL INSULATION**

*Reference Guide  
and  
Buyer's Directory  
for the  
South-Southwest*

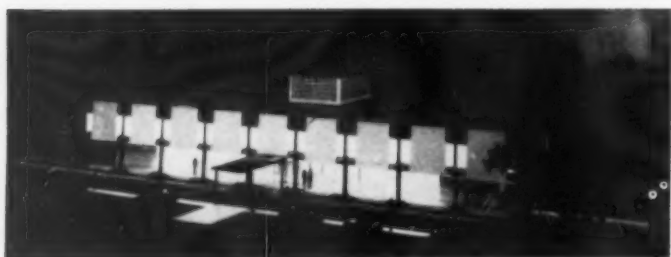
Reference Guide and Buyers' Directory (included in SPI's regular December '61 Edition) will feature:

**NEW PRODUCTS BRIEFS & BULLETINS —**

sheets & fiber . . . blocks & boards . . .  
magnesia & asbestos . . . cork, felt &  
wool . . . silica & mica . . . cements &  
adhesives . . . jackets & coatings.

**SALES ENGINEERS** serving you in The Industrial  
South-Southwest — Directory type listings  
including name, address and phone number.

This is SPI's annual technical service aid in  
the Thermal Insulation field for 1961 —  
a real service to you and 17,500 other  
Consulting-Operating-Maintenance personnel  
in over 12,300 plants in The Industrial South-  
Southwest.



### **Sirrine Building Nears Completion at Greenville**

The new office building for **J. E. Sirrine Company**, Engineers and Architects of Greenville, South Carolina, is progressing on schedule according to an announcement by George Wrigley, Jr., president.

The 32,000 sq ft, two-story, air conditioned building incorporates many interesting features. The second floor extends over the first, providing shade for the first floor window areas and also sheltered access to the building. Drafting rooms and departmental offices are on the second floor. Executive offices, conference rooms, reception area and security vault for drawings are on the first floor.

### **A-C Southern Distributors**

Three new Southern distributors have been named for **Allis-Chalmers Industries Group** products.

Dixie Electric Sales Company, Memphis, becomes a distributor for Allis-Chalmers motors, control, pumps and transformers in the territory covered by the company's Memphis district office plus several counties in Missouri. The firm is headed by J. W. Hunt, Jr.

The McIver Equipment & Supply, Winter Haven, Florida, has been appointed distributor for Allis-Chalmers motors in ten counties in Florida.

Textile Sales & Service Company, 425 High Brook Drive, N.E., Atlanta, will serve as a distributor for Allis-Chalmers motors, control, vacuum and centrifugal pumps, transformers and rotary compressors, and will be an agency for switchgear and unit substations.

The company will serve the textile industry on these products in Georgia and that portion of South Carolina covered by Allis-Chalmers Atlanta district office. R. J. Jennings is company president.

### **G.E.—Southeast**

The pending retirement of Carter L. Redd as **General Electric's** Southeastern region vice-president in Atlanta, and the election of Charles J. Ellis as his successor was announced recently.



Carter L. Redd



Charles J. Ellis

Mr. Ellis, a native of Louisiana and long-time resident of both Georgia and Florida, formerly served as district manager of electric utility sales for G.E. in Tampa.

The Southeastern region includes North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi and Tennessee.

Mr. Redd, regional vice-president in Atlanta since 1956 and a veteran

of 40 years association with the company, will serve as consultant to Mr. Ellis until January 1, 1962, when his retirement becomes effective.

Mr. Ellis joined G.E. in 1936 upon graduation with a B.S. degree from the U. S. Naval Academy. After several engineering assignments with the company in Schenectady, he was transferred to the Chattanooga, Tenn., sales office in 1937. He was named manager of the Tampa office in 1947.

Subsequently, he was named manager of User Industry Sales for the Florida territory and then district manager of electric utility sales for the Florida District comprising offices in Tampa, Miami and Jacksonville.

Mr. Redd joined General Electric in 1922, the year he was graduated from Virginia Polytechnic Institute with a B.S. degree in electrical engineering.

After a year on the company's engineering test program in Schenectady, he was assigned to the Apparatus Sales Division in the Southeast, serving in various sales capacities in Birmingham and Atlanta until World War II.

In 1945, he was appointed Southeastern district manager of the Apparatus Sales Division with headquarters in Atlanta, Ga., a post he held for 11 years. In 1956, he was elected a regional vice-president.

### **Engineering Firm Opens Charlotte Office**

**Henningson, Durham & Richardson**, engineering and architectural firm, has opened an office in Charlotte, N. C.

Robert Southworth has been named manager of the Charlotte operation.

Henningson, Durham & Richardson has purchased all the stock and taken over the practice of Vannort Engineers, Inc. of Charlotte. B. O. Vannort began practice in the city in 1938 and died in 1959.

### **Hays Corp. — E. Tenn.**

George W. Massey Company, Knoxville, Tenn., has been named exclusive representative for eastern Tennessee by **The Hays Corporation**, for its complete line of process and power system instrumentation used throughout industry.

# POWELL PERFORMANCE PAYS OFF

Any way you look at it, Powell Valve performance really pays off—performance that's conclusively proven in power plants everywhere.

You can find at Powell any type of valve you may need to handle water, oil, gas, air, steam, corrosive fluids, even molten metals and other radioactive materials used in atomic power plants.

Consequently, Powell can help simplify flow control

projects and contribute real savings in time and money. For example, in describing a modern 125,000-KW steam-electric generating plant, a leading authority recently listed some 80 areas requiring a total of over 1300 valves . . . Powell could have supplied almost every one.

Learn how this Powell performance can mean a real payoff for you. Contact your nearby Powell Valve distributor, or write direct.



150-pound Steel Globe Valve with welding ends. Outside screw rising stem and yoke. Bolted flanged bonnet. Screwed-in seat ring. Sizes, 1" through 12". Screwed or flanged end valves are available.



600-pound Steel Swing Check Valve with welding ends. Bolted flanged cap. Disc hung on a 5° angle allows full flow through when wide open. Screwed-in seat ring. Sizes, 1/4" through 8". Can be furnished with flanged or screwed ends.



150-pound Steel Gate Valve with welding ends. Outside screw rising stem and yoke. Bolted flanged bonnet. Solid wedge disc, screwed-in seat rings. Sizes, 1/4" through 20". Can be supplied with screwed or flanged ends.

See our catalog in Sweet's

115th year of manufacturing industrial valves for the free world

**POWELL STEEL VALVES**

THE WM. POWELL COMPANY CINCINNATI 22, OHIO





**Byron Jackson Pumps —  
Birmingham & Washington**

E. W. Stegman has been promoted to the position of Washington District Manager of **Byron Jackson Pumps, Inc.**, at 1204 Wisconsin Ave., N.W., Washington, D. C. Mr. Stegman, a registered Professional Engineer, joined the company at Greenville, S. C., in 1959, and later that year was transferred to the Birmingham, Ala., office as District Manager.

J. Don Lee, formerly District Manager for Byron Jackson in Charlotte, N. C., succeeds Mr. Stegman at Birmingham.

**Roots-Connersville  
Midland, Texas**

**Roots-Connersville Blower**, Division of Dresser Industries, Inc., has announced the opening of a new Branch Office in Midland, Texas. Mr.



LeRoy C. Laycock, formerly of the Roots Houston Office, has been appointed Branch Manager. The new office is at 1501 West Industrial Ave., P. O. Drawer 4217, Midland.

A graduate of the University of Houston and a registered professional engineer, Mr. Laycock previously served as the Roots Gas Meter Sales

Specialist for the oil and gas producing industry in the Texas-Louisiana area.

**Memphis Wholesaling Firm**

F. H. Harris, who recently resigned as Vice-President — Sales, Engine Parts Division, **Gould-National Batteries, Inc.**, St. Paul, will now actively head his own automotive battery and engine parts wholesaling firm in Memphis, Tenn.

The company, formerly Battery Warehouse, Inc., has been renamed **Battery & Parts Warehouse, Inc.** Located at 399 Cumberland St., the firm will distribute the Gould-National line of batteries. In addition it will warehouse complete stocks of Pedrick piston rings, Superior-Arrowhead engine parts and filters, as well as allied parts of other manufacturers.

**Lunkenheimer—W. Texas**

Appointment of John L. Rice as sales representative has been announced by the **Lunkenheimer Co.**,



Cincinnati, Ohio, manufacturer of valves.

Mr. Rice will cover West Texas, including El Paso, and Borger and Pampa in the Panhandle; and all of New Mexico. His address is 1104 North Big Spring, Midland Texas.

**S-P Mfg. Corp.—S.E.**

J. A. Postell Fluid Power Company of Atlanta, Georgia, has been appointed exclusive Southeastern factory representative for **The S-P Manufacturing Corporation** of Cleveland, Ohio.

The firm of licensed professional hydraulic engineers serves the Southeastern area, with sales offices in Chattanooga, Birmingham, Tampa, Charlotte, Columbia, S. C., and Atlanta.

Sales for the Postell organization are headed up by Harvey G. Williams, engineering graduate from Georgia Tech. Engineering functions are headed by Nelson V. Gore, graduate engineer from Clemson College.

**Homestead Valve  
Regional Manager**

Fred J. La Pointe has been selected as Regional Manager for the Valve Division of **Homestead Valve Manufacturing Company**, in Florida, Georgia and Alabama. Mr. La Pointe will make his headquarters at Deerfield Beach, Florida. His address is P. O. Box 466, Deerfield Beach.

**Rapistan of Carolina**

Distribution of materials handling equipment in North and South Carolina is now being performed by the newly organized **Rapistan of Carolina, Inc.**, at Charlotte, representing **The Rapids-Standard Company, Inc.** of Grand Rapids, Mich.

Manager of conveyor sales and engineering for the new firm is C. T. Collins. Regional manager for sales of casters, slotted angle and hand trucks, is Edsel M. Owen. Mr. Owen will also serve accounts in Georgia and the eastern part of Tennessee.

**J. B. Booth Heads Western  
Precipitation—Atlanta**

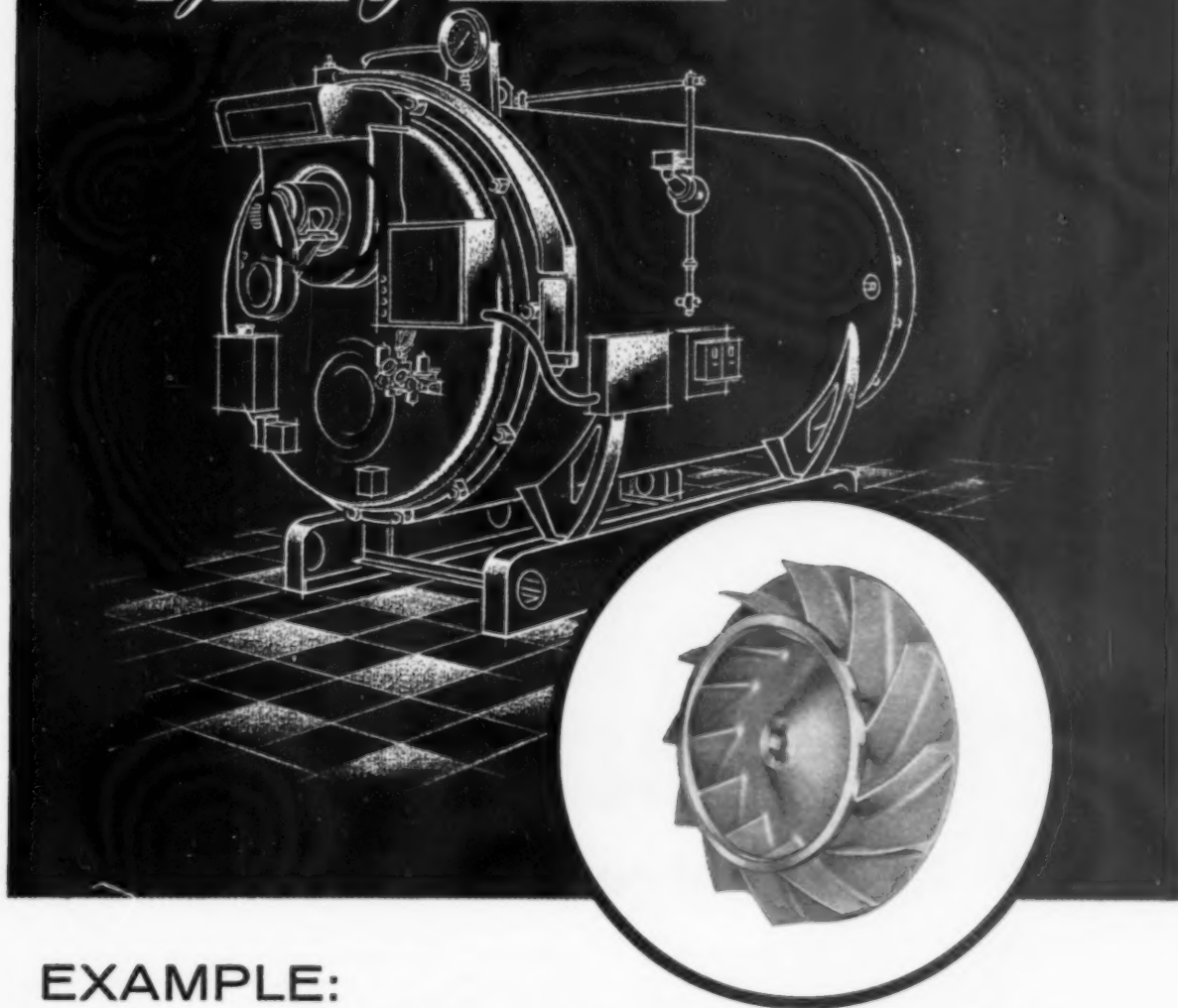
John B. Booth has been named manager of the Atlanta office of **Western Precipitation Division of Joy Manufacturing Company**.



Mr. Booth has been with Western Precipitation for three years, and most recently was in charge of sales in Southern California. In his new assignment he will be responsible for sales of all types of dust collection equipment made by the company.



*Engineering Excellence stands out...*



## EXAMPLE:

### Cleaver-Brooks exclusive *caseless fan*

This patented fan is the heart of a highly efficient forced draft system. Unique in design and function, this caseless impeller — made of sturdy cast aluminum, located deep within the front head of the boiler — provides combustion air at the required pressure and in the proper quantity to assure you of peak efficiency at any load level.

Efficiency extends into the area of maintenance, too. This fan never needs cleaning. Direct drive connection, without special bearings or V-belts, keeps the operation free from trouble... contributes to the quietest operation for any boiler you can buy today. Good reason why you should *insist* on Cleaver-Brooks.

Your Cleaver-Brooks agent has years of experience in boiler application. Contact him for more information on the features that exemplify the engineering excellence of Cleaver-Brooks.

*Write for free booklet, "How to Select a Boiler."*

**Cleaver  Brooks®**

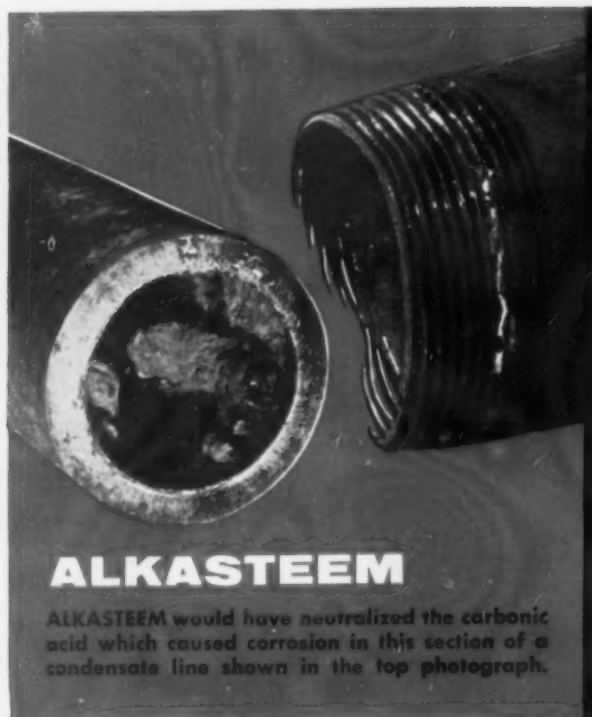
ORIGINATOR AND LARGEST PRODUCER  
OF PACKAGED BOILERS

Dept. M, 305 E. Keefe Ave., Milwaukee 12, Wis.

PERFORMANCE PROVES THE ENGINEERING EXCELLENCE OF CLEAVER-BROOKS BOILERS

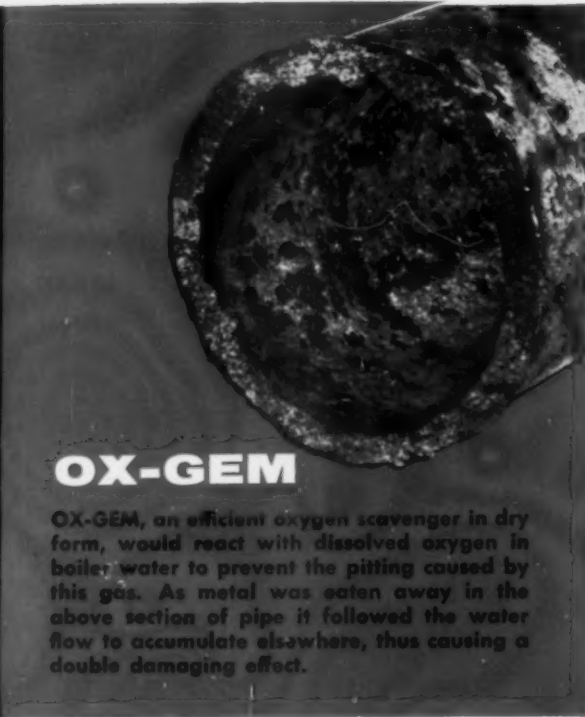
# ALKASTEEM & OX-GEM

prevent corrosion in boilers and return lines



## ALKASTEEM

ALKASTEEM would have neutralized the carbonic acid which caused corrosion in this section of a condensate line shown in the top photograph.



## OX-GEM

OX-GEM, an efficient oxygen scavenger in dry form, would react with dissolved oxygen in boiler water to prevent the pitting caused by this gas. As metal was eaten away in the above section of pipe it followed the water flow to accumulate elsewhere, thus causing a double damaging effect.

## save expensive replacements

You can stop the corrosion in boilers, steam lines, steam traps, valves, unit heaters and return condensate lines. Corrosion is frequently caused by dissolved gases such as carbon dioxide and oxygen. When these gases occur in combination the rate of corrosion is greatly increased. If corrosion is allowed to go unchecked the result, of course, is costly shut-downs for repair and expensive replacements.

Throughout the South, hundreds of engineers rely on ALKASTEEM and OX-GEM and the counsel of Anderson's field service representatives to check these corrosive gases. The life of

equipment is prolonged and the operating efficiency of your system is increased. The Anderson man is a good man to know.

### FREE SURVEY AND ANALYSIS SERVICE

Anderson Service Representatives will be glad to discuss your particular water problems and make recommendations based on an analysis of the makeup water. There is an Anderson representative in your area who will gladly work with you. His services cost you nothing. They can save you much.

*Write, Wire or Phone*

SPECIALISTS IN MAKING  
WATER BEHAVE



**Anderson Chemical Company, INC.**

Macon, Ga., Box 1424 • Phone Sherwood 5-0466  
Memphis, Tenn.: Box 2432, DeSoto Station • Phone: Broadway 2-2806  
Dallas 7, Texas: Box 10444, Industrial Station • Phone: Riverside 8-7080

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NOVEMBER, 1961

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***With Your SPI Service Cards***

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**BUSINESS REPLY CARD**

FIRST CLASS PERMIT NO. 582, SEC. 34.9, P. L. & R., ATLANTA, GA.

Reader Service  
SOUTHERN POWER & INDUSTRY  
1760 Peachtree Road, N. W.  
Atlanta 9, Georgia



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**BUSINESS REPLY CARD**

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Reader Service  
SOUTHERN POWER & INDUSTRY  
1760 Peachtree Road, N. W.  
Atlanta 9, Georgia







# NEW Catalogs & Bulletins

... there is always a **BETTER WAY**

## MAINTENANCE—TOOLS EQUIPMENT & METHODS

**3—Metallizing**—Use industry's low-cost "putting-on" tool. Now within reach of the smallest shop. Bulletin tells how you can spray carbon steels, stainless, babbitts, brass, nickel, aluminum. — METCO, INC.

**4—Simplified Lubrication**—You may be using up to five times as many lubricants as you need; up to five times as many ordering, billing, handling, stocking problems. Booklets on Multipurpose lubricants show how you can cut maintenance costs and inventories.—GULF OIL CORPORATION.

**9—TUBE MAINTENANCE NEEDS**—Automatic expander drives, tube cutters, tube expanders, tube cleaners, etc., described in Catalog 77-88.—THOMAS C. WILSON, INC.

**11—Rust Preventives**—Selection factors for proper NO-OX-ID rust preventives for maintenance application featured in Bulletin 3200. Covers type of coating, product, recommended uses, physical characteristics, method of application.—DEARBORN CHEMICAL COMPANY.

**16—Epoxy Coatings**—Form 1014 describes advantages of epoxy coatings for highest resistance to chemicals, wide variety of uses, flexibility and adhesion, and abrasion resistance. — Valdura Paint Division, AMERICAN-MARIETTA COMPANY.

**26—TEMPERATURE MEASUREMENTS**—Take accurate measurements wherever you go—laboratory, plant or field—with the compact 3½ lb MiniMite null-balance potentiometer pyrometer. Range scales can measure temperatures from minus 450 F to plus 3200 F. Use it for standard checking and calibrating procedures. Automatic cold-junction compensation is built-in. — THERMO ELECTRIC CO., INC.

**37—Maintenance Gun**—Brochure describes the Von Arx Air Gun — lightweight tool for tough cleaning, de-scaling and de-rusting jobs. Air operated reciprocating needles adjust to contours automatically. Three sizes. Comes in handy kit with accessories.—MARINDUS COMPANY.

**50—Industrial Weed Problems?**—Any man can weed-proof 10,000 sq ft in ten minutes with Ureabor — the dry granular weed-killer. You only use 1 to 2 lb per 100 sq ft. Folders give details on long-lasting control and your nearest distributor. — UNITED STATES BORAX & CHEMICAL CORP.

**51—Chimney Protection**—New non-asphaltic, spray applied coating for use in concrete, steel, and brick chimneys inhibits corrosion from acid exhaust gases. Customer field tests rate STACKFAS outstanding on heat, acid and fly ash abrasion resistance. — BENJAMIN FOSTER COMPANY.

**53—Steam Line Treatment**—Folder describes alkaline IPCO S-L-T. Used in boiler water, it will volatilize and travel with steam to return lines. Prevents costly repairs and provides insurance against replacing pipe and fittings. — IPCO, INC.

**57—ALUMINUM PAINTS**—Subalox Anodine Finishes are colored aluminum paints with rust-inhibitive base, giving top chemically-active protection. Easy to apply by brush, spray or roller. Bulletin No. 7 shows colors and gives details. — SUBOX INC.

**63—Heat-Proof Coatings**—4-page Form MPC 5-460 tells you how to stop corrosion and destruction of metals with heat-proof protective coatings. — MARKAL COMPANY.

**67—PNEUMATIC TOOL CLEANER-OILER**—Dust and grit enter air tools and with lubricating oil leave resinous deposits which progressively slow down tools and result in excessive wear and expensive repairs. New Von Arx Cleaner-Oiler cleans and lubricates all kinds of air tools without dismantling them. Service time on average tool is 3 min. using non-flammable solvents and light oils. Cleaning unit is portable.—THE MARINDUS COMPANY, INC.

**72—Vinyl Spray**—Bulletin describes the Aerosol vinyl spray for instant repair and protection — an air dry vinyl coating which adheres to practically any clean, dry surface. — QUELCOR, INC.

**99—TURBINE & GENERATOR MAINTENANCE**—New South-eastern all-inclusive Maintenance Service Contract complements the activities of your regular maintenance department on a scheduled basis.

Consulting Specialist calls at your prescribed intervals — checking equipment, advising plant personnel on operating problems, and submitting recommendation report.

Fuel costs can be minimized, unscheduled outages can be reduced, trained crews cut outage time during overhaul, and planning techniques cut overhaul time by pre-shutdown ordering of necessary parts. — WESTINGHOUSE ELECTRIC — SOUTHEASTERN REGION.

## FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

**100—Power Plant Pumps**—Bulletin BJP 58-8 covers complete line of standard pumps for power plant requirements — from 12,000 hp, doublecase boiler feed pump, to condensate, circulating and booster pumping duty. Also, special pumps for nuclear power plant installation. — BYRON JACKSON PUMPS, INC.

**105—Heat Exchanger**—Heat recovery is dollar recovery. By capturing ordinarily wasted heat and putting it to useful work, modern heat exchangers have proven a great source of plant economy. New 12-page bulletin describes the Fin-Pak, an efficient lightweight heat exchanger for gas turbine and diesel and gas engine cycles, chemical and food processing, steam air heating, etc. — AIR PREHEATER CORPORATION.

## KEEP UP-TO-DATE USE SPI READER SERVICE

Fill in item numbers on postage paid card at left.

**122—Industrial Fans**—Bulletin 702 covers Type XL fans for air and material handling. Volumes to 130,000 cfm, pressures to 18" SP Catalog 855 describes Pressure Fans. Volumes to 12,000 cfm, 10" to 50" SP. — CLARAGE FAN CO.

**149—STEAM GENERATION PUMPING NEEDS**—Bulletin 176 describes full line of centrifugal pumps for efficient boiler feed, condensate and heater drain service, booster service, and general service.—PACIFIC PUMPS, INC.

**154—Chemical Feeders**—Bulletin 202, 4 pages, illustrates and describes the Ful-O-Feeder chemical system for continuous heavy duty service. — FULBRIGHT LABORATORIES, INC.

**170—Pumping Problems?**—Two stage, Type JC pump will meet requirements up to 650 gpm. Horizontally split casing top can be taken off quickly for inspection and rotating parts removed and replaced without disturbing piping, connections, fittings or driver. — THE WEINMAN PUMP MFG. CO.

## Bulletins (Cont.)

### INSTRUMENTS—METERS CONTROLS—REGULATORS

**201—TEMPERATURE CONTROL SYSTEM**—New air-control system will tame wide ranging, fast changing loads of instantaneous heaters and modern heat exchangers. Cascade principle plus use of extremely fast responding bi-metal temperature sensing element reduce time lags and provide control stability. Bulletin 9 gives details. — SPENCE ENGINEERING COMPANY, INC.

**207—Control Centers & Systems** — Combustion safeguard and automation packaged control centers insure full coordination of complete system, place responsibility on one source, insure correct wiring, and reduce field labor. Catalog C11 illustrates variety of designs and circuits now in use. — WEBSTER ENGINEERING CO.

**225—Cooling Controls**—Self-powered controls for compressors, stills, solvent coolers, degreasers, and small engines are described in Bulletin 710; operational and hook-up sketches. — SARCO COMPANY INC.

**235—Liquid Level Gauges**—Bulletin 463A describes automatic remote reading systems for nearly any liquid. Features include easy to read dial indication. — LIQUIDOMETER CORP.

**238—Auxiliary Alarm on Remote Gages**—Bulletin C6 — Eye-Hye Remote Reading Gage with electrode and relay adaptation actuates auxiliary audible or visible signals at high or low water levels. — RELIANCE GAUGE COLUMN CO.

**243—ENGINE MIXTURE CONTROL** — Performance report E16-1 describes application of Bailey system at Panhandle Eastern Pipe Line Company. Pneumatic computer control saved fuel and reduced maintenance costs of 72 turbo-charged four-cycle gas engines. — BAILEY METER COMPANY.

**267—Remote Liquid Level Indicators** — Bulletin RI-1825 describes indicators for pressures up to 3000 psi — advantages, operation and specific installations. — YARNALL-WARING COMPANY.

**286—Feedwater Regulator**—Bulletin 1055 describes the Flowmatic Type P feedwater regulator, applicable for marine or stationary service. Gives mechanical description of components and schematic diagram showing suggested piping arrangement. Also specification table. — COPES-VULCAN DIV.

**295—Two Fuel Cut-Out Controls in One**—Float operated and electrode operated fuel cut-out functions contained in one device. Bulletin D2.5 describes convenient optional hook-up possibilities, for pressures to 350 psi. — RELIANCE GAUGE COLUMN CO.

**298—INDUSTRIAL PROCESS CONTROL**—Here are tips on selecting the most effective and economical temperature regulating valves for instantaneous heaters, storage heaters, air control systems and for combination of very low pressure differentials and air or water control. Detailed information in Bulletin IV 1014. — SPENCE ENGINEERING COMPANY, INC.

## KEEP UP-TO-DATE USE SPI READER SERVICE

See pages 69 & 70

### PLANT CONSTRUCTION—WELDING EQUIPMENT—SPECIALTIES

**300—Buyer's Guide**—Up-to-date industrial and maintenance building products stock list. Includes complete listing of all Rasco distributed products plus branch locations. — REYNOLDS ALUMINUM SUPPLY CO.

**301—Vacuum Cleaning Systems** — How portable and stationary systems cut costs and increase plant efficiency shown in Booklets P8 and AB-100. Eight heavy duty units (1½ to 15 hp) for cleaning hard to get at areas, reclaiming valuable materials. — Air Appliance Div. of HOFFMAN INDUSTRIES.

**305—Compressed Air Dryers** — Stop freezing of air lines inside and outside the plant; extract moisture and foreign particles; protect pneumatic equipment against corrosion and operate for less than 1-cent per 18,000 cu ft. 16-page brochure with charts gives details. — VAN PRODUCTIONS CO.

**310—Incinerator** — Metal cased, insulated, refractory lined incinerators for industrial and commercial use. City smoke code approved. Fast, economical installation — any size and capacity. — NORTH STATE PYROPHYLLITE CO., INC.

**311—INFRA-RED HEATING**—Overhead gas fired Panelbloc can do almost any kind of industrial heating job. Needs no electrical connections, has no fans, motors or blowers. AGA, Underwriters and CGA approved. Bulletin PC-159SP gives details. — PANELBLOC DIVISION, Bettcher Mfg.

**324—Painting New Plants** — "Plan Painting of New Plants to Reduce Costs" describes how lead-suboxide paints can save 1 or 2 coats of paint on new plants. Eventual repainting costs are cut as well since these paints form a dense, metallic lead film which can be recoated without expensive scraping, sanding or repriming. — SUBOX INC.

**332—Heat Transfer Equipment** — If you have material to liquefy, heat, vaporize, superheat, condense,

cool or solidify, check Bulletin HE-8 describing exchangers designed for temperatures as low as minus 160 F and as high as 1600 F with pressures ranging from vacuum to 9500 psi. — HENRY VOGT MACHINE CO.

**357—Mechanical Lubricators**—Various force feed mechanical lubricators, accessories, and components available for lubrication systems described in Bulletin L-60. — MANZEL.

**386—Rigid Frame Buildings**—8 page bulletin "Dixisteel Rigid Frame Buildings" — low cost, flexibility of design, durability, and minimum maintenance; also triangular or bow-string truss all-steel roof systems; fabricated for rapid erection. — ATLANTIC STEEL COMPANY.

**391—LOW-COST HEATING** — As completely self-contained heating system or in conjunction with existing heating and air conditioning (same ducts can be used) new Thermo Directaire Heater offers flexibility at minimum cost. Directaire booklet 30X gives details for many types of space heating or for manufacturing processes under strict thermostatic control. — TODD PRODUCTS, a Div. of Todd Shipyards.

### PIPING—VALVES—FITTINGS STEAM SPECIALTIES—TRAPS

**406—Blow-Off Valves**—Unit-tandem valves for boiler pressures up to 665 psi described in Bulletin B-435. Tells how to specify and how to order. — YARNALL-WARING COMPANY.

**408—Wide-Range Valves** — Data Sheet 10-5 covers the "Point 4 Factor Trim" — answer to those few types of applications where reduced capacity trim is desirable. Available in V-port and solid turned designs for double or single seated valves and in wide variety of material. — MASON-NEILAN DIV.

**411—Steam Trap Book** — 48 page manual reviews importance of good trapping. Gives complete data on traps and strainers. Contains complete selection, installation, testing and maintenance information. Many useful tables and charts. — ARMSTRONG MACHINE WORKS.

**417—Welding Fittings** — Seamless and welded fittings featured in Bulletin 60-C. Features industry's most complete line of directional changes, branch connections, flanges and special types. — MIDWEST PIPING COMPANY.

**429—Expansion Joints** — Advantages of the Gun-Pakt expansion joint described in Bulletin EJ-1917. No shutdowns for repacking. Installation suggestions. — YARNALL-WARING CO.

**435—Liquid Level Controls** — Cat. 405 gives full details and specifications of wide-range types of controls for a wide variety of applications. Employ torque tube packless design. Six types of mounting connections. — MASON-NEILAN DIV.

**439—PLASTIC LINED VALVES** — Metal for strength and long life; plastic lined for purity of end product — data sheet describes the new Y Valves to safely control flow of hazardous, corrosive and erosive fluids. 150 lb W.P. Available in 1", 1½", and 3" sizes.—THE WM. POWELL COMPANY.

**443—PVC Fittings & Flanges**—Corrosion resistant polyvinyl chloride pipe fittings and flanges covered in 12 page catalog, featuring characteristics, advantages, limitations, operating pressures, temperatures and field tests. — GRINNELL COMPANY, INC.

#### BOILERS—STOKERS BURNERS—FUELS

**505—Refractories** — Paco High Heat Duty and Super Duty Plastic Refractories. Fire brick, high temperature cement, castables. Installation and engineering service. Free estimates and inspection. — NORTH STATE PYROPHYLLITE CO.

**513—Compact Economy Boiler** — Side-fired units give 20% more usable floor space than end-fired units of same capacity. Largest model of line only 134" x 76" — gas or oil fired 6 to 50 hp; 100 to 125 lb pressure; 201,000 to 1,673,950 Btu/hr capacity. Wired, assembled and tested at factory. Catalog 140 gives details. — LOOKOUT BOILER & MANUFACTURING.

**516—Fuel Savings** — How the packaged Ljungstrom air preheater boosts performance and offers fuel savings for small boilers and process applications is highlighted in 14 page bulletin. Boiler as small as 25,000 lb/hr can have advantages of regenerative preheating — saves fuel, boosts output, and permits use of lower grade fuels.—THE AIR PREHEATER CORPORATION.

**517—Generating Steam?** — Get this complete story on boiler operation, maintenance and equipment with suggestions on preventive control. Prevent costly shut-down caused by mineral deposits and corrosion. — FULBRIGHT LABORATORIES.

**528—HOW TO SELECT A BOILER** —Booklet highlights engineering excellence — single tip burner nozzle, rotary air damper, air nozzle purge and other features contributing to greater efficiency in burning of fuel.—CLEAVER-BROOKS.

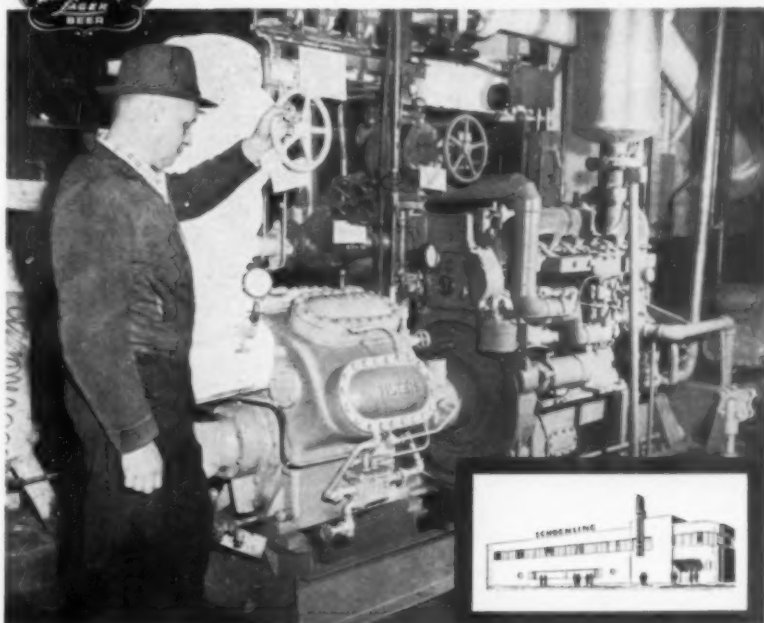
**529—Boiler-Burner Lease Plans** — New rental plan for Power-master boilers and burner systems covers use of equipment and cost of installation without capital investment. — ORR & SEMBOWER, INC.

**536—Automatic Boiler-Burner Unit** — Assembled plant (Scotch-type, two-pass) for all heat or power applications, low pressure or high pressure; burner to match for heavy oil, light oil, or combinations of gas/light or gas/heavy oil. Easy maintenance. Bulletin SPI-100 gives details. — INDUSTRIAL COMBUSTION, INC.

## Top Efficiency Brewing Schoenling with a Gas Driven Vilter Compressor



The Schoenling Brewing Co., Cincinnati, has earned a reputation for fine beer with Schoenling Cincinnati's Finest.



Mr. Raymond Winterhalter, Chief Engineer, The Schoenling Brewing Co., inspecting the gas driven Vilter VMC ammonia compressor. Inset shows exterior view of the brewery.

To most efficiently meet summer brewery refrigeration requirements, the Schoenling Brewing Co. has added a Vilter 8-cylinder VMC ammonia compressor driven by a natural gas engine to its earlier purchased electric motor driven Vilter compressors.

By switching to the natural gas engine driven compressor during the summer months, when its gas requirement for heating purposes is reduced, Schoenling is able to utilize the major portion of the gas charged for, thereby reducing electric power demand and effecting considerable savings.

The natural gas engine driven compressor is especially ideal where capacity reduction is necessary to match widely fluctuating loads. Automatic speed regulation of the power unit can be supplied so that, together with the automatic capacity control available on Vilter VMC compressors, the most economical engine speed to suit the refrigeration requirements is automatically selected and maintained.

Schoenling is well pleased with the operation of the gas driven Vilter VMC compressor, and as a result of the reliability obtained, they have been able to reduce their cost of operation.

Almost 90 years of service to the brewing industry has given Vilter the necessary experience to produce the superior refrigeration equipment used with satisfaction in hundreds of breweries throughout the world. Let our qualified engineers help you with your problems.

Sold through Vilter Distributor, C. P. Wood and Company, Cincinnati



**Vilter Manufacturing Corporation**  
Milwaukee 7, Wisconsin  
Air Units • Ammonia and Freon Compressors • Booster Compressors  
Blowdown Coolers • Water and Brine Coolers • Blast Freezers  
Evaporative and Shell and Tube Condensers • Pipe Coils  
Valves and Fittings • Pakice and Polarflake ice machines.



Write for Bulletin 017 to Vilter Manufacturing Corporation, Dept. SP-602 2217 South First Street Milwaukee 7, Wisconsin





## Bulletins (Cont.)

**541—CONDITION WATER - PROTECT BOILERS**—Braxton conditions water to remove and prevent scale formation and corrosion. Maintains proper alkalinity and softness in boiling water. Keeps boiler operating at top efficiency, eliminating shut-downs and repairs caused by corrosion and scale.—ANDERSON CHEMICAL COMPANY.

**543—BARK & COAL FIRED BOILER CONTROL**—Fully-automatic combustion control at Hammermill Paper described in 12 page Bulletin 1078. System performance under unusual firing conditions is described.—COPEL-VULCAN DIVISION.

**552—RotoStoker**—Cat. 860 describes overthrow spreader type stoker with power or hand operated dumping grates or stationary grates. Burns all grades of bituminous or lignite coals, many refuse fuels.—DETROIT STOKER CO.

**567—Boiler Equipment**—New data on steam generators in sizes to 500,000 lb/hr, for high or low steam pressures and temperatures, for all types of fuel and firing methods.—WICKES BOILER CO.

**581—STEAM OR HOT WATER**—fire-tube and water-tube package boilers. 4-pass, down-draft design provides minimum 5 sq ft heating surface for each unit of hp rating. Catalog S-15 describes sizes 20 to 600 bhp for pressures up to 250 psi or for hot water.—SUPERIOR COMBUSTION INDUSTRIES INC.

**574—Packaged Generator**—Bulletin 582 describes Vapormatic Coil-N-Shell Steam Generator for service requirements of 5 to 150 psig. Gives operation features and specifications. Available with gas, oil, and combination gas/oil fuel systems.—TEX-STEAM CORP.

**587—Coal-Fired Packaged Boiler**—The new semi-automatic stoker-fired unit available in standard sizes of 43,000, 50,000 and 63,000 lb/hr, described in Bulletin PG-59-4. Performance characteristics, line drawings, and photos included.—FOSTER WHEELER CORPORATION.

### POWER TRANSMISSION MATERIAL HANDLING

**600—Mechanical Shaft Seals**—Chempro mechanical external seal described in Bulletin CP-551. First seal designed for complete interchangeability with packing. No mounting clamps, machinery stuffing box faces or drilling holes. Install in 30 min. Adjust after installation.—CHEMICAL & POWER PRODUCTS, INC.

**605—Cranes & Hoists**—Production moves faster, more efficiently and you increase usable storage space with Job-Mated cranes and hoists. Bulletin gives the right combination of capacity, clearance, speed, controls

and components to handle each job best.—SHEPARD NILES CRANE AND HOIST CORP.

**606—Retaining Ring Kits**—400 Tru-arc cadmium plated rings—84 sizes in one economy kit. Sizes from 1/4 to 2 1/2 in. in three most used series of internal, external and universal crescent ring designs—\$34.50 per kit.—DIXIE BEARINGS, INC.

**608—Side-Loading Trucks**—One unit can easily load, stack and transport long, bulky selective loads. Traveloader maneuvers in aisles only 6 1/2 ft wide; electric and gas powered units; low maintenance features.—BAKER INDUSTRIAL TRUCKS.

**614—Vertical Transportation**—Catalog A-382 describes and illustrates details of passenger and freight elevators and escalators for use in all types of industrial plants.—OTIS ELEVATOR CO.

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**626—BEARINGS**—Brochure details complete bearing and specialty lines available through 18 Southeastern Service Centers. Plant surveys, inventory control, application engineering also part of service to customers of replacement bearings.—DIXIE BEARINGS, INC.

**628—General Purpose Trucks**—Catalog T-54 describes two-wheel hand trucks and platform—a full line manufactured in Rome, Ga. plant to cover your material handling needs.—THE FAIRBANKS CO.

**635—Bearings & Bars**—Pocket size edition 158 gives complete list of cast bronze and sintered bronze bearings and bars. Bearing aluminum bar data included.—THE BUNTING BRASS AND BRONZE COMPANY.

**641—Belt Conveyors**—Cat. ID-591, 88 pages, shows principal belt conveyor products, including heavy duty and standard roller bearing and precision ball bearing idlers. Engineering data for proper selection.—CONTINENTAL CONVEYOR & EQUIPMENT CO.

### WATER TREATMENT—HEATING & AIR CONDITIONING—DUST & FUME CONTROL—REFRIGERATION

**701—Exhausting Corrosive Fumes**—Bulletin 702-A shows how corrosive fumes can be exhausted with rubber, lead lined or specially coated fans.—CLARAGE FAN CO.

**702—Water Conditioning**—Bulletin 611C, 20 pages, describes manual and automatic softeners, zeolites and



ion exchange resins, mixed-bed and multi-column deionizers, dealkalizers, ion exchange systems, filters and purifiers, and water treating chemicals. — ELGIN SOFTENER CORPORATION.

**703—Industrial Air Conditioner —**

Bulletin 122 describes methods to obtain control of air properties with accuracy of 1% in R. H. and 1 F in temperature (up to 140 F dew point) with compact high capacity apparatus. Entirely independent of the use of moisture-sensitive instruments. — NIAGARA BLOWER COMPANY.

**705—Test Your Tower—**

Bulletin offers simple, proven method of determining how closely actual tower performance measures up to specified performance. Particularly applicable to operations geared to temperature of process cooling water. — THE MARLEY COMPANY, INC.

**706—Centrifugal Blowers & Exhausters —**

Catalog ACB-104 covers units providing uniform air pressure up to 10 psi, or vacuum up to 12-in. of mercury. Volumes to 20,000 cfm. Line provides clean, dry air or gas at constant pressure for many processes. — Air Appliance Div., HOFFMAN INDUSTRIES.

**709—Purer Process Water —**

Data tells how Ferri-Floc (ferric sulfate) can help with coagulation and softening, removal of iron and manganese and other water purification problems. — TENNESSEE CORPORATION.

**713—Electric Precipitators—**

26 page Bulletin 104 shows how units meet five engineering requirements — positive control of gas flow; high, uniform electrode emission; effective continuous cycle rapping; and safe, trouble-free high voltage equipment. Gives 9 steps to successful installation. — BUELL ENGINEERING COMPANY, INC.

**714—Algae in Cooling Towers—**

Special report is two-year study of algae in cooling towers in all parts of the country. Valuable reference piece for your water treatment library. — DEARBORN CHEMICAL COMPANY.

**733—Air Handlers —**

Technical bulletins describe air handling units 665-47,000 cfm capacity. — ACME INDUSTRIES, INC.

**751—Chemical Service—**

Water conditioning products, equipment and services highlighted in literature — boiler feedwater treatment, cooling water treatment, corrosion inhibitors, fuel oil additives, coagulants, cation resin cleaners. — Chemical Service Dept., THE PERMUTIT COMPANY.

**752—Automatic Water Control —**

4 page bulletin describes Chemtrol control for treatment of cooling tower water. Adaptable to any size unit, in any location, and to any type water, it controls pH, prevents scale, controls corrosion and eliminates algae — all simultaneously, completely automatically and economically. — WATER SERVICES INC.



*In fact, it can make the difference between minimum fire damage and extended production down-time on valuable processing equipment and buildings.*

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## ADVANTAGES OF COUNTERFLOW\*

**A Better Method of  
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**THIS PATENTED METHOD  
PROVIDES MORE EFFICIENT  
OPERATION OF WATER  
PURIFYING EQUIPMENT.**

In conventional ion-exchange equipment (demineralizers), water flows downward through a bed of ion-exchange resin until the resin is "exhausted" or loaded with ions. Then, the resin is regenerated by downward passage of acid or alkali.

During the service cycle, the ions most difficult to exchange concentrate near the bottom of the bed — sodium in the cation resin and silica in the anion resin. Downflow regeneration means these ions are contacted by partially-spent regenerant, unless large excesses of regenerant chemicals are used. As a result, they are not completely eluted from the bed, and are gradually leached out during the following service run.

In COUNTERFLOW\* equipment, service flow is down, but regenerant flow is *upwards*, with a "barrier" to prevent fluidization of the resin. The result — greater regenerant economy, and leakage of unwanted ions reduced by 50% to 75%. COUNTERFLOW\* IonXchangers are now providing high quality low-silica boiler feed water in central power stations. The original results observed† in the first large installation in 1956 have been shown to be typical.

(† Caskey and Harding, American Power Conference, 1957).

\*COUNTERFLOW is the trademark of Illinois Water Treatment Company equipment utilizing an up-flow method of regeneration with a "barrier" to keep the bed from expanding.  
U.S. Patent No. 2,891,007.

For detailed information, address:

**ILLINOIS WATER TREATMENT CO.**  
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NEW YORK OFFICE: 141 E. 48th St., New York 17, N.Y.  
CANADIAN DIST.: Pump & Sifters, Ltd., London, Can.

## Bulletins (Cont.)

**756—Refrigeration Problems?**—VMC compressors, intercoolers, chillers, described in Bulletin 817—design improvements, protective devices and factory-run-in-tests.—THE VILTER MANUFACTURING CO.

**780—Cooling Water Control**—Bulletin describes the Chemicator... for automatic control of scale, corrosion and slime in cooling towers and evaporative condensers. Trouble-free design with no moving parts.—IPCO LABORATORIES, INC.

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### ELECTRICAL

**803—Power Control**—Bulletin describes design, manufacturing and consulting services for motor control centers; switchgear; power centers; specialty, mechanical and automation control requirements.—POWER CONTROL COMPANY.

**804—Conductor Identification**—New phase identification set (Bulletin 82SP) saves labor costs on phase determination and conductor identification on underground systems without need for removing all safety grounds. Transmitter operates from either 60 cycle supply or self-contained dry cells.—JAMES G. BIDDLE CO.

**813—600-Volt Wiring**—How Anaconda Densheath 900 offers long life, high heat and moisture resistance, chemical stability and easy installation is described in Bulletin DM-5612.—ANACONDA WIRE & CABLE CO.

**861—ELECTRICAL PROTECTION**—For modern, all-purpose protection of circuits up to 600 amp, Fusetron fuses have 100,000 amp interrupting capacity and sufficient time-lag to hold harmless overloads. Bulletin FIS covers dual-element fuses; Bulletin HCS Hi-Cap fuses.—BUSSMANN MFG. DIVISION.

**874—High Voltage Rubber Cables**—32 page catalog contains information on design features, insulations available, and performance highlights of company's butyl rubber power cable, Durasheath. Also data on kinds of available constructions from 600 v to 15,000 v conductors.—ANACONDA WIRE & CABLE CO.

**877—Motor & Commutator Maintenance**—Line of resurfacers, flexible abrasives, grinders, brush seaters, undercutters and other tools described in Motor Maintenance

Products catalog.—IDEAL INDUSTRIES, INC.

**880—Electrical Test Kit**—Amprobe literature describes Test-Master Kit—all equipment you need for electrical testing jobs.—PYRAMID INSTRUMENT CORP.

### Late Bulletins

**W-1—Engine Mixture Control**—Performance Report E16-1, 2 pages, describes application of engine mixture control system which solved problem of Panhandle Eastern Pipe Line Co. in reducing cost and maintenance.—BAILEY METER COMPANY, 1050 Ivanhoe Road, Cleveland 10, Ohio.

**W-2—Feedwater Treatment**—Bulletin 30, 24 pages, is "An Introduction to Boiler Feedwater Treatment," and answers many important questions on the subject.—NALCO CHEMICAL COMPANY, 6216 West 66th Place, Chicago 38, Ill.

**W-3—Combustion Control**—Bulletin 1078, 12 pages, discusses fully automatic combustion control for a boiler fired with waste bark and coal in combination at Hammermill Paper Co. Includes illustrations.—COPES-VULCAN DIVISION, Blaw-Knox Company, Erie 4, Pa.

**W-4—Sludge Process**—Bulletin No. 7320, 4 pages, describes four recent equipment and flowsheet developments for activated sludge waste treatment process.—DORR-OLIVER INC., Stamford, Conn.

**W-5—Bearings**—Brochure shows all the lines of bearings and bearing specialties for which the company is authorized distributor.—DIXIE BEARINGS, INC., 276 Memorial Drive, S.W., Atlanta 3, Georgia.

**W-6—Recorders**—Bulletin GEA-6933A, 12 pages, describes full line of direct and servo-operated switchboard and portable recorders, with specifications, dimensions, applications, and other selection data.—GENERAL ELECTRIC COMPANY, Schenectady 5, N. Y.

**W-7—Steel Flooring**—Inland 4-Way Safety Plate Bulletin, 8 pages, covers three thicknesses of raised lug pattern steel plate for use as safety flooring material for slip and fire resistance.—JOSEPH T. RYERSON & SON, INC., Box 10006, Charlotte 1, N. C.

**W-8—Ball Valve**—Circular 612, 2 pages, details the new Type 316 Stainless Steel Ball Valve, designed for corrosive fluids, gases, and general corrosive services.—LUNKENHEIMER CO., Cincinnati 14, Ohio.

**W-9—Control Valve**—Catalog DCV-1, 8 pages, shows complete line of Control Valves from ¼" to 6" sizes, available in ductile iron, cast iron, cast steel, stainless steel, bronze, monel, and aluminum. Gives pressure and temperature ratings, charts, and other data.—OPW-JORDAN, 6013 Wiehe Road, Cincinnati 37.

**W-10—Industrial Air Handling**—Bulletin ASQ-102, 12 pages, covers performance and characteristics of "SQ" Airfoil line of fans. Includes selection tables for each of the seven sizes (8" to 18") in both single and double inlets for operation up to 9" static pressure.—CHICAGO BLOWER CORPORATION, 9800 Pacific Ave., Franklin Park, Ill.

**W-11—Heater Sections** — Bulletin IFB-61, 12 pages, describes and illustrates heater sections for air conditioning preheat, fresh air supply, and process and drying applications, with a face-and-bypass damper system for temperature control.—L. J. WING MFG. CO., Linden, New Jersey.

**W-12—Industrial Fans**—Bulletin A-1401, 48 pages, presents line of Sirocco fans, Series 81, Class I and II, with discussion of construction features and operating characteristics. Provides capacity tables and illustrations. — AMERICAN - STANDARD INDUSTRIAL DIVISION, Detroit 32, Mich.

**W-13—Diaphragm Valves** — Catalog Sheet No. 171, 4 pages, introduces new single seat pressure reducing diaphragm valves that contain "O" rings and eliminate stuffing boxes, thus reducing maintenance to a minimum.—ATLAS VALVE COMPANY, 280 South St., Newark 14, New Jersey.

For More Free Data FILL IN CODE NO. on the Handy Return Card — Page 69

**W-14—Recirculation Control**—Bulletin MSA-196, 8 pages, tells how Hagan system employs temperature rise of feedwater through the feed-pump to regulate an ample recirculation flow for pump protection. — HAGAN CHEMICALS & CONTROLS, INC., Controls Division, Hagan Center, Pittsburgh 30, Pa.

**W-15—Speed Changers** — Bulletin 51B9061B (4, 5 & 6 case sizes), 2 pages; and Bulletin 51B1042 (case sizes 2 & 3), 4 pages, present design features of the Vari-Tex speed changer, providing dependable low cost variable speed. — ALLIS-CHALMERS MFG. CO., Milwaukee 1, Wis.

**W-16—Process Feeding**—Bulletin No. 420-1, 8 pages, covers feeding, weighing, blending and proportioning equipment for the controlled feeding of liquids and solids in process industries.—B-I-F INDUSTRIES, Providence 1, R. I.

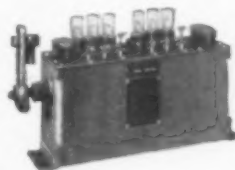
**W-17—Closed Circuit TV**—Bulletin ATVB-100.1 10M, 8 pages, explains how closed-circuit television can be used for surveillance, transportation and dispatching, cost reduction and quality control, and other industrial and scientific purposes. — FAIRBANKS, MORSE & CO., Electronics Division, 100 Electra Lane, Yonkers, N. Y.

## How to STRETCH



## a drop of oil...

Manzel force-feed lubricators squeeze the full potential out of every drop of oil you purchase. Model "94", for example, pumps against pressures up to 3,000 pounds, handling any grade of oil from the lightest mineral oil to the heaviest cylinder stock with the same regularity. Model "94" starts, stops, speeds up and slows down in synchronization with your machinery. Every change in engine speed brings a corresponding change in the amount of oil delivered. For details on our whole line of *responsive, responsible* lubricators, write for our catalog. Manzel, 257 Babcock Street, Buffalo 10, New York. For the most efficient lubrication,



ask the man from



# Manzel

SPECIALISTS IN LUBRICATORS AND METERING PUMPS SINCE 1898





# NEW Product Briefs

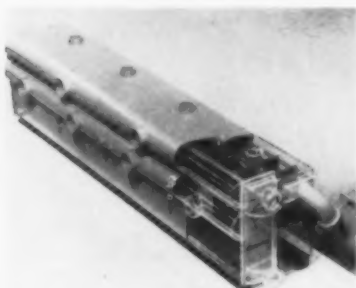
... there is always a BETTER WAY

## FOR MORE INFORMATION ON FOLLOWING ITEMS

Fill in Code Number on Return Card — Page 69

### Flash Evaporator

**L-1** Single and multistage flash evaporators with integral low-pressure heaters are offered by the **Westinghouse Electric Corporation**, Box 2099, Pittsburgh 30, Pa. The inclusion of the low-pres-



sure heaters saves space, reduces connecting piping problems, and increases operating efficiency for producing boiler make-up water.

Flash evaporators with feedwater heaters are compact, thus piping and installation costs are low. By having the heaters as an integral part of the flash evaporator, a unified design is possible.

A complete package includes brine heater, flash chamber, evaporator condenser, and pressure heaters, built for shipment as a single piece. All the water chambers in the condensate circuit are integral so that no intermediate piping is required. Therefore, shipping, handling, installation, and external piping costs are reduced.

### Ratchet Wrench

**L-2** A new line of ratchets has been introduced by **Crescent Tool Company**, Jamestown, N. Y.

Strength, simplicity and serviceability are increased in the new line.

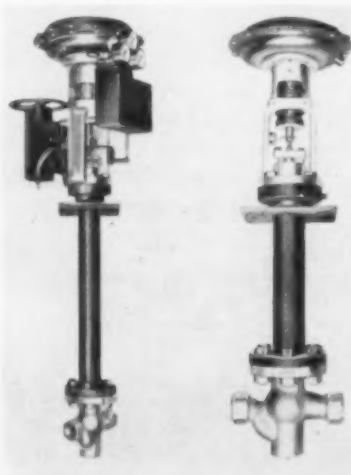
Use of a small, oil-resistant neoprene rubber plug inside the ratchet eliminates the need for complicated and fragile springs which are normally used to actuate and hold in position the pawls of a ratchet. The new ratchet is so simple in design it can be field stripped with a pocket knife and easily re-assembled.

### Cryogenic Control Valves

**L-3** **Leslie Co.**, 230 Delafield Ave., Lyndhurst, N. J., announces the addition of a new design in Cryogenic Control Valves to its line of regulators and controllers.

The throttling control valve is a globe type that eliminates the drawbacks common to split body and conventional globe designs in that it is tight closing through cool-down, on-stream runs and defrost periods.

Because the Cryogenic Control Valves employ a Cage-Trim design which eliminates seat ring threads and gasket crush as sources of leakage problems, they have been accept-



ed for services where the wide temperature variations between start-up and defrost had created leakage problems.

Another special feature permits complete disassembly of the valve from the top end. Particularly important where the valve is embedded in heavy insulation or a cold box, this quick inspection feature even permits change of valve characteristic without removing the valve body from the pipe line.

### Master Controller

**L-4** The **Reliance Instrument Division of Electro-Mech Corporation**, 500 Livingston St., Norwood, N. J., has developed a new master pressure controller for multiple boiler installations.



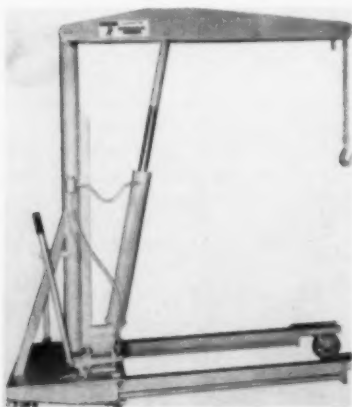
The new controller is capable of maintaining steam pressure within  $\pm 2\%$  over operating ranges from 15 to 2000 psi. It utilizes a K Monel bourdon tube as the primary sensing element.

The controller operates in conjunction with Reliance Instrument electronic balanced-bridge control circuits. It may contain up to nine master sending potentiometers, enabling it to control nine boilers from a common header. This gang control permits load balancing or base loading, as required, for most efficient operation. The same controller, with a filled bourdon tube system primary, may be used as a temperature controller over ranges from 200 to 1000 F.



## Hydraulic Cranes

**L-5** Ruger Equipment Incorporated, 615 West 4th St., Urichsville, Ohio, has announced a new series of 2-ton capacity mobile multi-purpose floor, truck and pedestal mounted hy-



draulic cranes. Designated the HP-2 Series, the new models are lighter, stronger and more maneuverable than previous models. These cranes permit one man to lift, transport and position loads in a single operation.

A patented Togoil hand pump, in combination with the 2-speed hydraulic system, provides variable effort and displacement without mechanical adjustment. A factory set overload relief valve assures safety and protection for operators, loads and equipment.

The unit will go through an 82" doorway, and will also reach up to 10' and to a maximum 123" with an extension boom.

## Cooling Water Treatment

**L-6** A new line of cooling water treatment products, designed specifically to meet the needs of medium and small sized air-conditioning installations, has been announced by **Dearborn Chemical Company**, Merchandise Mart Plaza, Chicago 54, Ill.

The products are known as Dearborn's "Aqua-Serv" line. Advantages include convenience of form — a briquette combination of polyphosphates, selected organics, and inhibited dry acid for precision control of scale, corrosion, and alkalinity; accurate and continuous feed — with visual control using exclusive Aqua-Serv stoker-feeders; safety — the dry acid content completely eliminating the well-known hazards associated with the handling of liquid acid for alkalinity control.

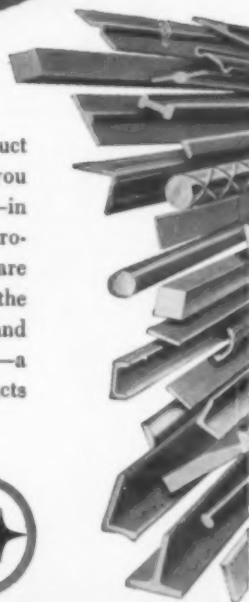
# WHERE THE QUALITY BEGINS IN

# DIXISTEEL

# ROLLED PRODUCTS



Steel is no different than any other product in this respect: to obtain top quality, you must start with the best raw materials—in our case the molten steel, which will be processed into the product you buy. Extra care is taken in making each heat to assure the finest quality bars, shapes, angles, flats, and others which bear the name DIXISTEEL—a hallmark that is your assurance of products that will fully meet your requirements.



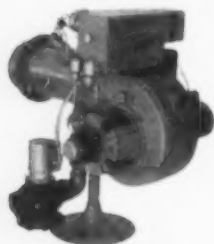
## Atlantic Steel Company

P. O. Box 1714, ATLANTA 1, GEORGIA—Trinity 5-3441

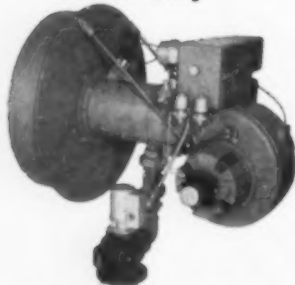
# all New Webster DUAL FUEL CYCLO<sup>\*</sup>NETIC Burner



Superior



in any



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TRADE MARK

Write for Literature

**WEBSTER  
ENGINEERING**  
TULSA 9, OKLAHOMA

**MA**

a division of  
Midland-Ross Corporation

## New Product Briefs (Continued)

### Remote Water Gauge

L-7

An electrically operated remote water level indicating system that needs no pressure-connections or compensating devices has been introduced by **The Reliance Gauge Column Company**, Cleveland 3, Ohio.



Called Electro Eye-Hye, the system detects water level with electrodes in a direct-to-drum water column for service pressures up to 3000 psi steam and 5000 psi cold. All connections between the water column and the panel indicators are electric, permitting placement of single or repeater indicators at any distance . . . without pressure connections.

Five different indicators are available. Three are ten-light indicators which register liquid levels on a column of lights, providing 180 degree visibility. Two are digital read-outs which project the liquid level — in inches above or below normal — onto a self-contained screen.

### Washable Filter

L-8

The Foam Division of **Scott Paper Company**, Chester, Pa., has developed a structurally different polyurethane foam that is finding



application in American Air Filter Company's "AAF Foamat Filter" for effectively removing contaminants from fresh and recirculating air. The units are washable and immediately reusable without oiling or other treatment.

The foam, with a life expectancy of 15 years according to laboratory tests, fills the need for an air filter medium to improve performance of central ventilating systems in factories and other installations with limited maintenance personnel. Previously the only other type of permanent filter, an all metallic unit, required washing and recoating of the element with oil before reuse.

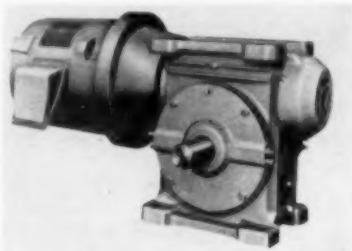
## KEEP UP-TO-DATE USE SPI READER SERVICE

See pages 69 & 70

### Right-Angle Gearmotors

L-9

A new line of right-angle gearmotors (Type W) with single-reduction worm gearing for use with apparatus driven by belts, chains or spur gear-



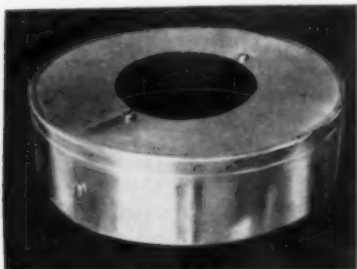
ing, as well as through couplings, has been introduced by the **Westinghouse Electric Corporation**, Box 2099, Pittsburgh 30, Pa. Available in both a-c and d-c integral types, the new unit is offered with a-c motors in NEMA frame sizes 182 (1 hp) to 286U (20 hp) or with d-c motors in sizes 187A (1 hp) to 286A (15 hp).

Single-reduction worm gearing offers high-ratio reduction with few moving parts in a close-coupled compact drive. The right-angle drive arrangement requires a minimum of space, without sacrificing dependability and performance. The involute helicoid thread form is used

with Westinghouse worm gearing, giving it a high load capacity and high efficiency which results in more output torque per dollar. This precision gearing also results in long life and quiet operation.

### Aluminum End Caps

**L-10** A new product to speed insulating and covering of pipe lines has been announced by **Premetco**, P. O. Box 1134, Shreveport, La., specialist in alumi-



num covering materials.

Designed to fit where insulation stops at valves, flanges and unions, the new end caps are fully preformed and ready to install. Their use effects a labor and material savings at the job site.

### Duct Fan

**L-11** **DeBothezat Fans Division** of American Machine and Metals, Inc., East Moline, Ill., announces a new "Bifurcator" duct fan. Motor and fan assembly slides out on rails for quick and easy inspection, while the "Bifurcator" housing remains in the duct. This is accomplished by removing a half-



## *IpcO Service will keep it clean!*

The boiler shown above was cleaned by IpcO Laboratories, and serves one of the South's largest railroads.

IpcO maintenance service will continue to keep it clean so that scale build-up will not recur...

Call CEdar 3-4162, Atlanta, Georgia, collect



2710 APPLE VALLEY ROAD  
ATLANTA 19, GEORGIA

Member of Associated Laboratories, Inc.

**We didn't  
make his "tank"...**



**...but we could have!**

## **SUPERIOR TANKS**

**are custom-engineered  
to fit any need.**

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**Call on us for SUPERIOR**

- Expansion OR Compression Tanks
- Blow Off Tanks
- Flash Tanks
- Boiler Breeching
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- Steel Pipe
- Anhydrous Ammonia Tanks
- Aluminum Tanks
- Stainless Steel Tanks



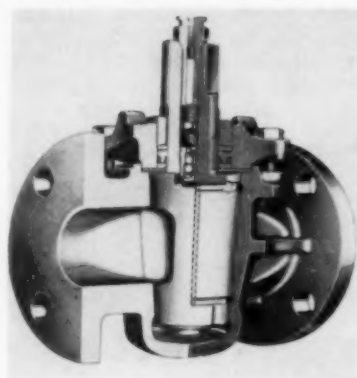
**YOUR GUARANTEE OF SAFETY,  
DEPENDABILITY, AND SUPERIOR  
PERFORMANCE**

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Telephone 938-4710

## **New Product Briefs (Continued)**

section of the housing cone.

According to the manufacturer, such improved accessibility cuts maintenance cost substantially. This slide-out feature is being offered as an optional extra. "Bifurcator" duct fans are used for exhausting corrosive fumes or gases which are abnormally hot, flammable or explosive. The motor is isolated from the destructive fumes handled by the fan. Fan wheel sizes are 12" to 48".



### **Differential Pressure Gauge**

**L-12** A differential pressure gauge with a 60 psi scale and a 3000 psi working pressure rating has been introduced by **Pall Corporation**, 30 Sea Cliff Ave., Glen Cove, N. Y.



Priced at \$92.00, the gauge has an accuracy of  $\pm 2\%$  and is designed for a temperature range of  $-40^\circ\text{F}$  to  $+200^\circ\text{F}$ .

These units have no mechanical linkages. They operate by means of a magnetic coupling which eliminates the possibility of leakage.

### **Plug Valves**

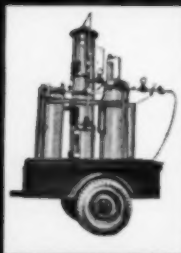
**L-13** A new concept in tapered plug valve design utilizing a high lubricity plastic coating that substantially reduces turning and provides lifetime maintenance-free operation was announced by **Rockwell Manufacturing Company**, Meter & Valve Division, 400 N. Lexington Ave., Pittsburgh 8, Pa. Rockwell Permaturn valves are designed to handle services ranging from jet fuels and chemicals to water and sewage.

For low pressure Permaturn valves — recommended for pressures

up to 1000 psi — the coating is Teflon, a polyfluoride thermoplastic with an extremely high softening point. For high pressure services — up to 10,000 psi — Permaturn valves are coated with phosphate-molybdenum disulfide. Both coatings are permanently bonded to the metal surfaces of the tapered plugs under closely controlled operations.

**For More Free Data FILL IN CODE NO.  
on the Handy Return Card — Page 69**

**WATER  
SOFTENING  
AND  
CONDITIONING  
IS OUR  
BUSINESS**



**MOBILE UNIT DESIGNED FOR THE UNIVERSITY  
OF FLORIDA**

Above is a unique, mobile, combination water softener and Deionizer.

One of the many softeners and conditioners designed and manufactured by Southern Water Conditioning, Inc. For further data, specifications, bids, or surveys, write to Southern Water Conditioning, Inc., 301 15th Ave. So., St. Petersburg, Fla.

All types of Domestic, Commercial and Industrial Water Softening and Conditioning Equipment - Filters - Taste & Odor Removers - Aerators - Demineralizers - Zeolite, Ion Exchange minerals in stock - Residential & Commercial Package Swimming Pool Filters - Rebuilding and modernizing.



**Southern Water Conditioning, Inc.**  
301 15th Avenue South  
St. Petersburg, Florida



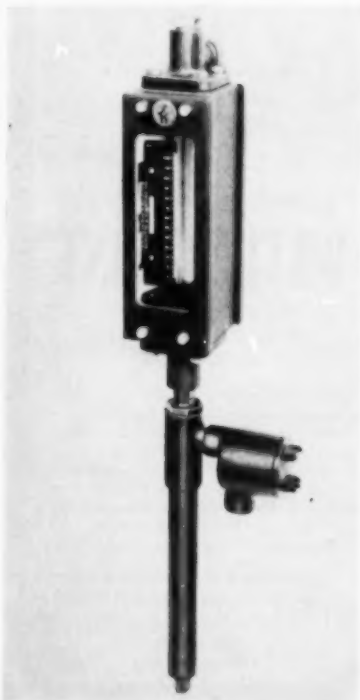
## Insulating Cement

**L-14** A new high temperature insulating cement with an increased effective temperature range to 2100 F is offered by **Baldwin-Ehret-Hill, Inc.**, Trenton, N. J. The material is called BEH No.1 Plus insulating cement. The highest effective temperature formerly available in a mineral wool insulating cement was 1800 F.

In addition to withstanding higher temperatures, the new cement is whiter than the 1800 F material, which it replaces, and is easier to handle. Through a reduction in nodule size of the mineral wool, the mixed material, ready for application, is less lumpy. Greater smoothness and uniformity are characteristic of the new material. Actual tests indicate dry coverage of 45 sq ft 1 inch thick per 100 lb. The linear shrinkage after heating to 2100 F is only 3%.

## Rotameter Transmitters

**L-15** **Schutte and Koerting Company**, Dept. MA-4, Cornwells Heights, Bucks County, Pa., has announced a new line of solid state electric Rotameter transmitters that are available with any of five d-c output signals to match the requirements of most ex-

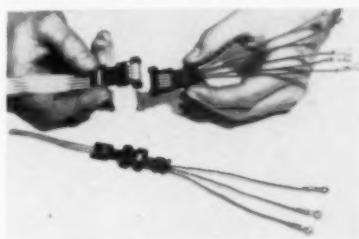


isting electric receivers or computers.

The new transmitters, which operate on an induction principle, are completely contained in a metal housing that is directly coupled to the company's "Safeguard" or metal tube Rotameters. The Rotameter transmitter is therefore capable of measuring and transmitting flow rates up to 200 gpm in pipe lines up to 3 in., at pressures up to 600 psig.

## Conductor Adapter

**L-16** An adapter device for interconnecting flat conductor cable with conventional round wire has recently been introduced by **The Thomas & Betts Co.**, 36 Butler Street, Elizabeth, New



Jersey. An addition to their line of Pos-E-Flex flat cable connectors, this round wire adapter simplifies the introduction of the revolutionary new flat cable to existing electrical and electronic equipment wiring systems.

It is used to terminate flat cable runs at conventional terminal boards or strips, and facilitates flat cable runs under rugs, tile, in chassis, along walls where the ultimate termination is to round wire. The new connector makes the use of flat conductor cable a practical reality for low voltage control wiring, intercom systems and remote control wiring.

## Cleanable Strainer

**L-17** **The Warner Lewis Company**, Tulsa, Oklahoma, announces that its new Industrial Division has developed a cleanable strainer called the Flo-Gard.

Because there are no bolts, nuts, or screws used in its construction, assembly is faster and easier. No tools are required for installation.

The corrosion-proof DuPont Delrin end caps are bonded by a corrosion-proof epoxy to monel screen and centertube. Uniform strength is assured by continuous welding by heliarc of extra heavy gauge metal.

The Flo-Gard can be used either as a sump or in-line cleanable strainer.

## Babbitt Adjustable SPROCKET RIM with Chain Guide Changes that Danger Zone to a SAFETY ZONE



— saves  
you money

ON  
EVERY  
VALVE

Every minute saved is money in your pocket. Cut out the waste of time, labor, floor space due to hard-to-reach valves. At the same time, convert Danger Zones to Safety Zones. Equip every overhead valve in your plant with Babbitt Adjustable Sprocket Rims with Chain Guides for day to day economy.

- They simplify pipe layout.
- They fit any size valve wheel.
- They are easy to install and operate.
- They operate any valve from the floor.
- They save time and money.
- The first cost is the only cost (no maintenance).
- They are packed completely assembled (one to a carton), with easy-to-follow instructions.
- A hot-galvanized rust proof chain is available for all sizes.

Babbitt Adjustable Sprocket Rims with Chain Guide are carried in stock by most mill supply houses. Just phone your mill supply salesman, or contact us direct.

**Babbitt**  
**STEAM SPECIALTY CO.**

168-9

3 BABBITT SQUARE, NEW BEDFORD, MASS., U.S.A.

# YOU, IONAC AND



How much should you pay to prevent scale? Corrosion? Foaming? Other water-caused problems in your steam-generating and cooling water equipment?

Now you can get the answers you need to do these jobs at lowest cost, through the comprehensive water treatment program available from Ionac.

This program has five steps: (1) Water Analysis, (2) Plant Survey, (3) Recommendations, (4) Periodic Supervision, (5) Continuous Control. Any part, or the entire program, can be administered for you by Ionac, a division of Pfaunder Permutit—the only company that makes both the chemicals and the equipment for water treatment. You, Ionac and... This integrated program is an example of the partnership between you and Ionac, in solving fluid treatment problems. Wherever there is a chance to raise efficiency or lower your costs, it takes only a call or letter from you to focus our specialized experience and facilities on your problem.

For details on the Ionac Water Treatment Program, write: Chemical Service Dept., Ionac Chemical Company, Dept. SPI-111, Birmingham, N. J.

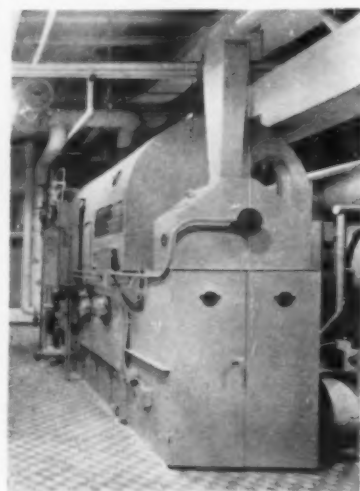
**IONAC**  
CHEMICAL COMPANY  
DIVISION OF PFAUDLER PERMUTIT INC.

## New Product Briefs (Continued)

### Packaged Coal Boiler

**L-18** Canton Stoker Corporation, 300 Andrew Place, S.W., Canton 1, Ohio, is now marketing a packaged coal-fired boiler for industrial plants and other installations.

The new "Powr-Matic" unit combines boiler, stoker, combustion con-



trol system, coal conveyor and ash conveyor... all completely automatic. Canton Stoker buys the boiler and some components. It makes the stoker, conveyors, and parts of the control system. The boiler is packaged at the Ohio factory.

At the suggestion of a bin level control, coal is picked up automatically in the coal bin and transferred to a small storage hopper at the front of the boiler. Controls attached to the steam or hot water lines signal the stoker mechanism to feed more or less fuel. At the rear of the furnace, ash is dribbled into enclosed container or conveyed outside the building. The unit can be operated at 10 to 100 per cent of capacity. Any number of units may be operated in tandem in a plant. Six sizes from 70 to 300 hp are available.

### Air Washer Units

**L-19** New air washer-evaporative cooler units that cleanse, humidify and cool incoming air are now being fabricated principally of rigid PVC (polyvinyl chloride) by the S & C Manufacturing Co., 3533 Cardiff Ave., Cincinnati 9, Ohio.

Except for the 10 gauge steel base and the stainless steel exterior frame-



work, S & C air washers are constructed entirely of PVC — this includes the top and side panels, piping, spray nozzles, even the nuts and bolts. Moreover, the metal base is positively protected by PVC paint outside and a rigid PVC lining inside. Metal constitutes no part whatsoever of the interior spray chamber or its fixtures.

Offering decided advantages over ordinary air washers made of metal or wood, the new PVC units will not rot, rust, corrode or support combustion... maintenance is negligible. Moreover, PVC air washers are light in weight — approximately



## INTRODUCING THE NEW DRYDEN-EAST HOTEL

39th St., East of Lexington Ave.  
NEW YORK

Salon-size rooms • Terraces • New appointments, newly decorated • New 21" color TV • FM radio • New controlled air conditioning • New extension phones in bathroom • New private cocktail bar • Choice East Side, midtown area • A new concept of service. Prompt, pleasant, unobtrusive.

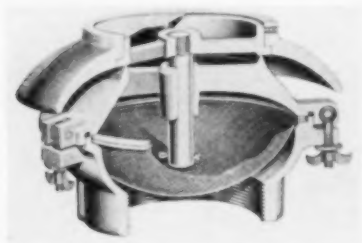
Single \$15 to \$22 Suites to \$60  
Special rates by the month or lease

Robert Sarason, General Manager  
ORegon 9-3900  
Teletype NY-1-4295

one-third the weight of units made from conventional materials. This light weight facilitates installation, eliminates need for structural reinforcement . . . reduces shipping costs as well.

### Relief Vent

**L-20** A new emergency pressure relief vent #209-U is now available from **OPW-Jordan**, 6013 Wiehe Road, Cincinnati 13, Ohio. Available in 6" and 10"



sizes, the vent is designed for use with bulk storage tanks. It minimizes product lossage and insures safer operation with its built-in safety features: double flame arresting screen, pressure relief top that op-

erates automatically at 10 ounces, fails safely at 200 F, extra large capacity.

## KEEP UP-TO-DATE USE SPI READER SERVICE

See pages 62 & 70

### Level Controller

**L-21** A simplified controller for maintaining correct liquid level measurement has been developed by **The Ohmart Corp.**, 4241 Allendorf Drive, Cincinnati 9, Ohio, manufacturer of nuclear gauging systems.

The new instrument can be applied to almost any size or type of vessel and provides continuous level indication or control. Using the Geiger-Mueller principle of radiation detection, the controller has sensing heads housed in thick steel tubes to meet explosion proofing requirements. Each head is six inches long and can be increased by six-



inch increments to meet specific applications.

Without moving parts, the instrument is installed so there is no contact with the material being measured. High or low viscosity materials can thus be controlled without clogging either the material or the instrument. Recording and other instruments may be located as far as 500 feet away from the new controller. Thermal stability is between -60 F and 150 F, permitting accurate readability under conditions of extreme cold or heat.

(Continued on page 88)

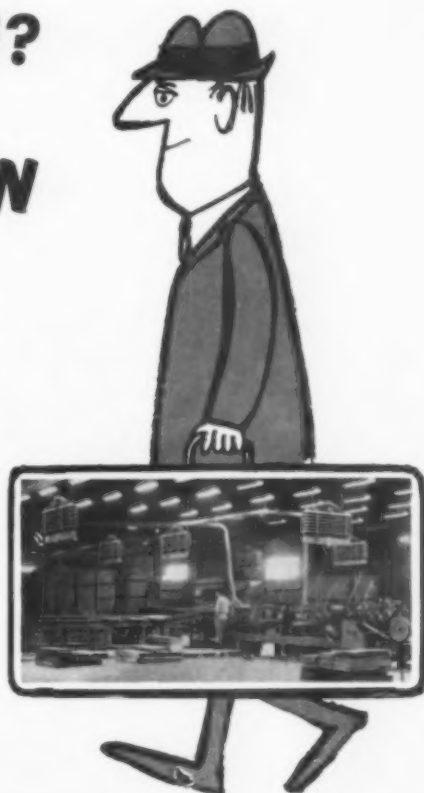
## INFRA-RED HEATING? I'VE GOT THE INFORMATION

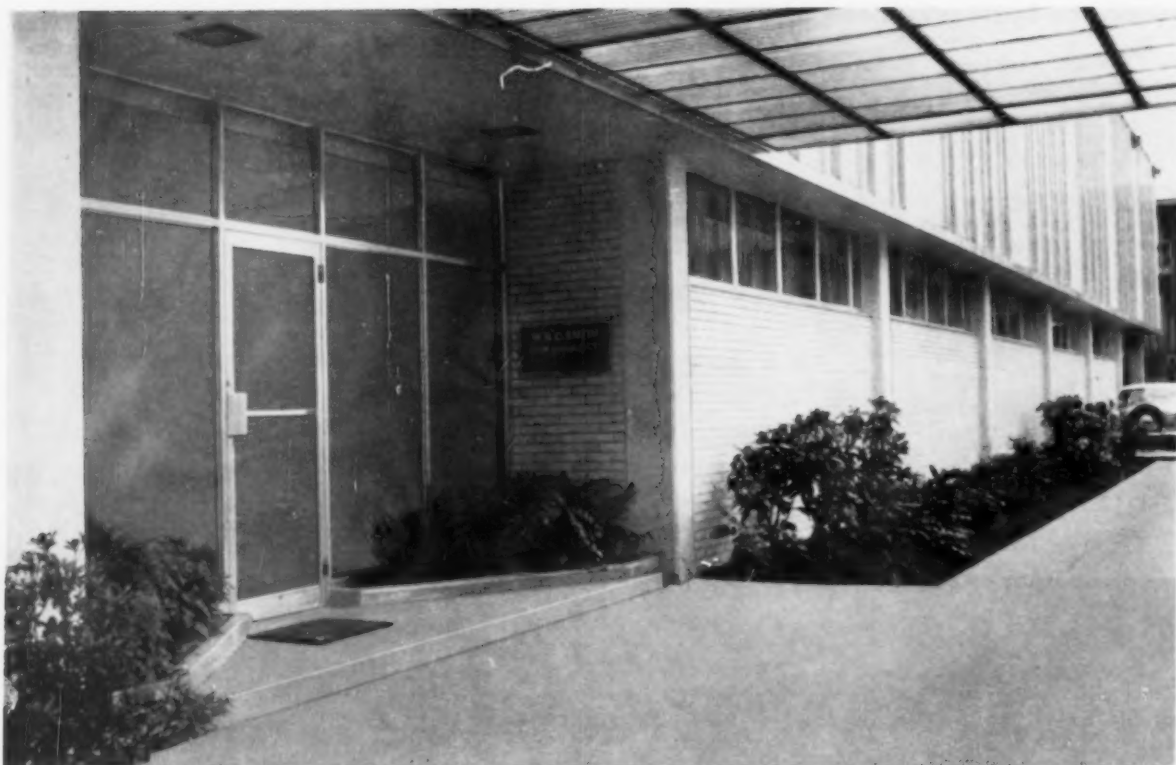
There is no mystery about infra red heating. Overhead gas fired Panelbloc can do almost any kind of commercial or industrial heating job and do it well. I can show you that Panelbloc needs no electrical connections, there are no fans, motors or blowers. Panelbloc "heats like the sun", warms everyone and everything in its effective range. I can show you Panelbloc is AGA, Underwriters and CGA approved. It is low in first cost and economical in its trouble-free operation. I am your Panelbloc man.

Write for information. Ask for Bulletin PC-159SP.



**PANELBLOC DIVISION**  
**The Bettcher Manufacturing Corporation**  
3106 West 61 Street Cleveland, Ohio





The front entrance on North side of building is seen here from the Peachtree Road approach.

## New Building for Smith Publications



**FIFTY-SIX YEARS** and sharp contrasts separate the spacious new headquarters of W. R. C. Smith Publishing Company from the one room office in which the enterprise began.

In 1905, a man with vision started his publishing career with two magazines — *Southern Engineer* and *Practical Machinist*. Setting up shop in a one room office in downtown Atlanta, W. R. C. Smith worked and prospered. His two publications soon grew to three. At the time of his death in 1941, the company bearing his name counted five successful magazines, and the organization occupied almost two full floors in the Grant Building on Walton Street.

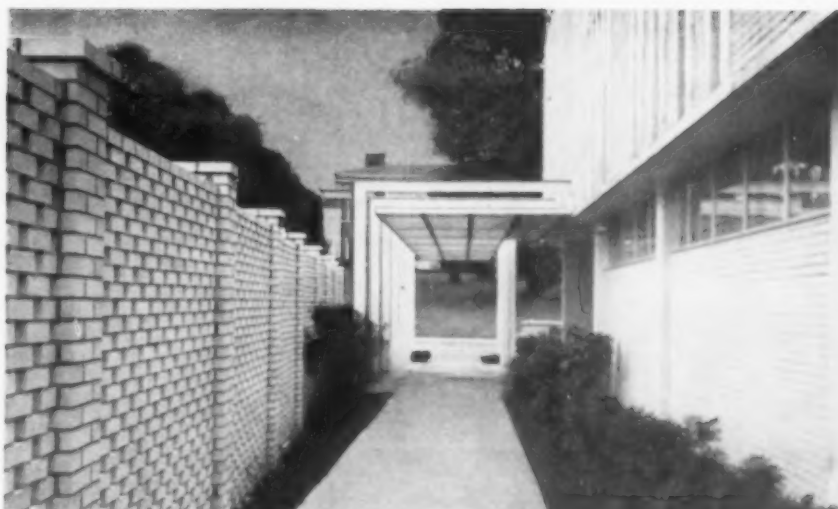
After the death of the founder, the company continued to expand

One of the lobby areas



Side of building  
seen  
from parking area

The photograph at  
center shows a  
typical office



under the leadership of W. J. Rooke and Richard P. Smith, now Chairman of the Board and President, respectively. In 1948, there were six publications and larger space was needed, so the company moved to improved quarters at 806 Peachtree Street, a mile and a half from the former offices.

Once again, forced by expanding operations, the company has moved to larger quarters. With eight publications clamoring for space, the time had come to have its own building. These handsome, functional offices with sixteen thousand square feet of floor space are situated at 1760 Peachtree Road, N.W. — on the exact site where Major Howell's battery defended this part of Atlanta in 1864.

The entire building was specially designed by Patrick McGinn & Associates of Atlanta to meet the exacting needs of modern publishing operations. Year-round air conditioning, brilliant lighting and tasteful decorating make these offices as nearly ideal as possible. The pictures shown here can convey only a general idea of the pleasant surroundings. But it is hoped that readers, advertisers and other friends will come and visit us in our new home.



Offices occupy center area with  
halls and work spaces on sides.

## New Product Briefs (Continued)

### Centrifugal Switch

L-22

A new Synchro-Snap centrifugal switch with negligible friction has been introduced by the EC&M Division of Square D Company, 4500 Lee Road, Cleveland 28, Ohio. The new switch



can be used for speed sensing, overspeed and underspeed detection, speed interlocking, sequencing and signaling.

The Synchro-Snap switch utilizes a simple one-piece spring steel disc with weights fastened directly to the disc. The centrifugal force of the weights overcomes the rapid decrease in spring force, resulting in a snap action at the operating speed. Normal operating speeds range from

900 to 4000 rpm and standard units operate at 1100 and 2200 rpm. Operating speed is factory-adjusted.

## KEEP UP-TO-DATE USE SPI READER SERVICE

See pages 69 & 70

### Potentiometers

L-23

Three new, low-cost, portable potentiometers have been announced by Leeds & Northrup Company, 4934 Stenton Ave., Philadelphia 44, Pa. These instruments provide on-the-spot measurements of temperature for instrument maintenance departments, and in testing and research work.

The 8694 Single-Range and 8695



Double-Range Temperature Potentiometers indicate temperatures directly in degrees F in any of 15 temperature ranges. The 8696 Double-Range Millivolt Potentiometer is calibrated for emf measurements on two ranges, 0 to 22 and 20 to 64 . . . has a manual reference junction compensation dial and can be used as a source of calibrated voltage for checking other potentiometer-type instruments.

## Four Fine Facilities in PITTSBURGH

### ALLEGHENY MOTOR INN

Opposite Greater Pittsburgh Airport. 60 air-conditioned rooms, tile bath, TV, radio, phone. Superb restaurant and cocktail lounge. Year-round swimming pool. Courtesy car to and from airport. AMherst 4-7790

### HOTEL PITTSBURGH

In the heart of the Golden Triangle. 400 outside rooms, bath, radio, TV, air-conditioning. General Forbes Lounge & Dining Room. ATLantic 1-6970

### JACKTOWN MOTOR HOTEL

1 mile west of Irwin Interchange on Route 30. 60 air-conditioned rooms with TV, telephone, combination tile baths. Excellent dining room and facilities for group parties. UNDERhill 3-2100

### HOTEL PITTSBURGH MOTEL

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## Armco Products Installed!



Armco's Construction Service, with 25 years of experience, is prepared to quickly handle installation of Armco tunnels, sewers, conduits, retaining walls, and buildings on a fixed-price basis. Call us for information.

Armco Drainage & Metal Products, Inc., subsidiary of Armco Steel Corporation, P. O. Box 1343, Atlanta 1, Georgia.

## GEORGIA ALABAMA

industries save money  
by buying stainless  
steel mixing tanks  
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WEST POINT, GEORGIA

## Automatic Analyzers

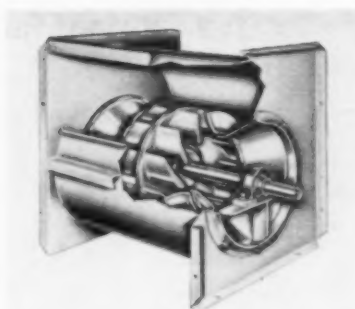
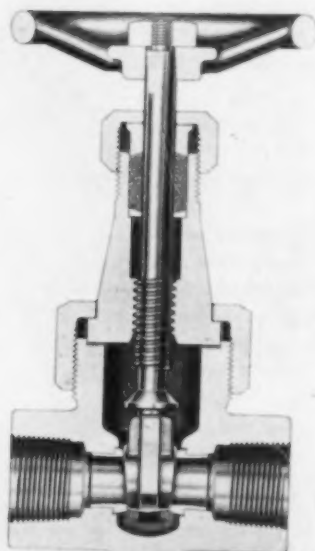
**L-24** Milton Roy Company, 1300 E. Mermaid Lane, Philadelphia 18, Pa., has introduced a line of automatic colorimetric analyzers for plants seeking automatic monitoring and control over hardness of water supplies.

Automatic colorimetric analyzers such as the Chemalyzer take a sample of a plant's water supply every 3 to 6 minutes and electronically analyze hardness present in such minute quantities as 0-3 parts per million. Biggest single benefit they provide is a continuous check of the performance of water treating equipment. Some plants with automatic analyzers are now obtaining 400 or more samples a day as insurance against accidental breakthrough of hardness in water supply.

## Small Gate Valve

**L-25** An inside-screw small steel gate valve, newly designed and compactly made for fast installation in a limited space, has been introduced by the Lunkenheimer Co., Cincinnati 14, Ohio.

This gate valve has screwed or socket ends, available in a bolted bonnet design in 1½" and 2" sizes, and in a union bonnet in sizes ¼" through 1". An inside-screw rising stem, solid-wedge disc, and rolled-in seat rings are features of the valve. Valves are rated 800 lb-850 F and 2000 lb-100 F.



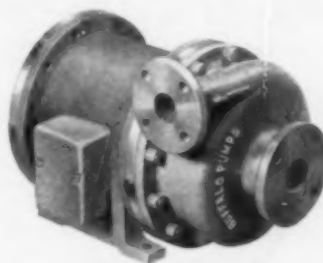
## Airfoil Fans

**L-26** A new series of fans, called "SQ" Airfoils, for varied industrial air handling applications has been introduced by Chicago Blower Corporation, Franklin Park, Ill.

New aerodynamic design of wheel and housing inlet enables fan to operate more quietly at lower speed and with greater efficiency. Because less power is required, smaller motors can be used to reduce power consumption and save installation space.

## Hermetic Pumps

**L-27** Buffalo Forge Company, 490 Broadway, Buffalo, New York, has developed a new line of centrifugal pumps, totally enclosed and hermetically



sealed for use with toxic, inflammable, or highly volatile liquids.

Simplified design includes a new, long-life, self-adjusting bearing. Mechanical seals and stuffing boxes are eliminated. Positive protection is provided against leakage of expensive or noxious liquids.

These single suction pumps with enclosed, hydraulically balanced impellers are ideal for transferring liquids in the chemical, petrochemical, atomic energy, marine, and other industries.



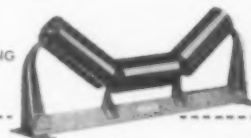
STANDARD DUTY



BALL BEARING



45° TROUGHING



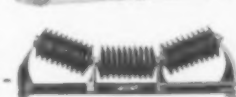
SELF-ALIGNING TROUGHING



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## STANDARD ITEMS FROM STOCK!

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## Another New Hospital to Meet the Critical Needs



### PIEDMONT HOSPITAL Atlanta

*Architects: SHUTZE, ARMISTEAD & SAGGUS AND ASSOCIATES - WILLIAMSON, VAUGHT AND SPIKER; Engineers: NEWCOMB & BOYD; Mechanical Engineering Contractor: GILLOOLY AND STEPHENSON; General Contractor: BEERS CONSTRUCTION COMPANY, Atlanta, Ga.*

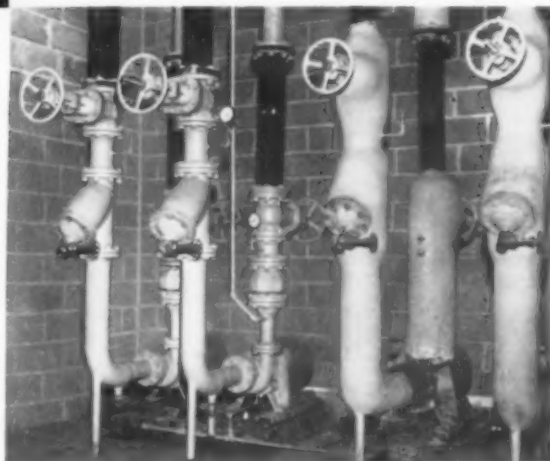
Like so many built today . . .  
equipped with **JENKINS VALVES**  
to minimize trouble and expense

Modern hospitals are planned with the knowledge their facilities will quickly be overburdened . . . that equipment will be overworked 24 hours a day, every day. Planned, also, to minimize operating expense and all the costs of hospital care.

When it comes to buying valves for the plumbing, heating and air-conditioning systems, experts in building hospitals have a ready and proved answer to the problem. One after another after another calls for JENKINS. They do it for an unbeatable reason:

An extra-measure of quality prepares Jenkins Valves to stand punishing service longer, and with less expense for maintenance.

Are you "settling for less" than the extra-measure of quality guaranteed by the famous Diamond trademark? You should not, for you can specify *Jenkins* without paying a penny more than you'd pay for any lesser brand name on a good valve. Jenkins Bros., 100 Park Avenue, New York 17, New York.



The entire plumbing, heating, air-conditioning system for this 300-bed hospital is controlled by Jenkins Valves.

# JENKINS

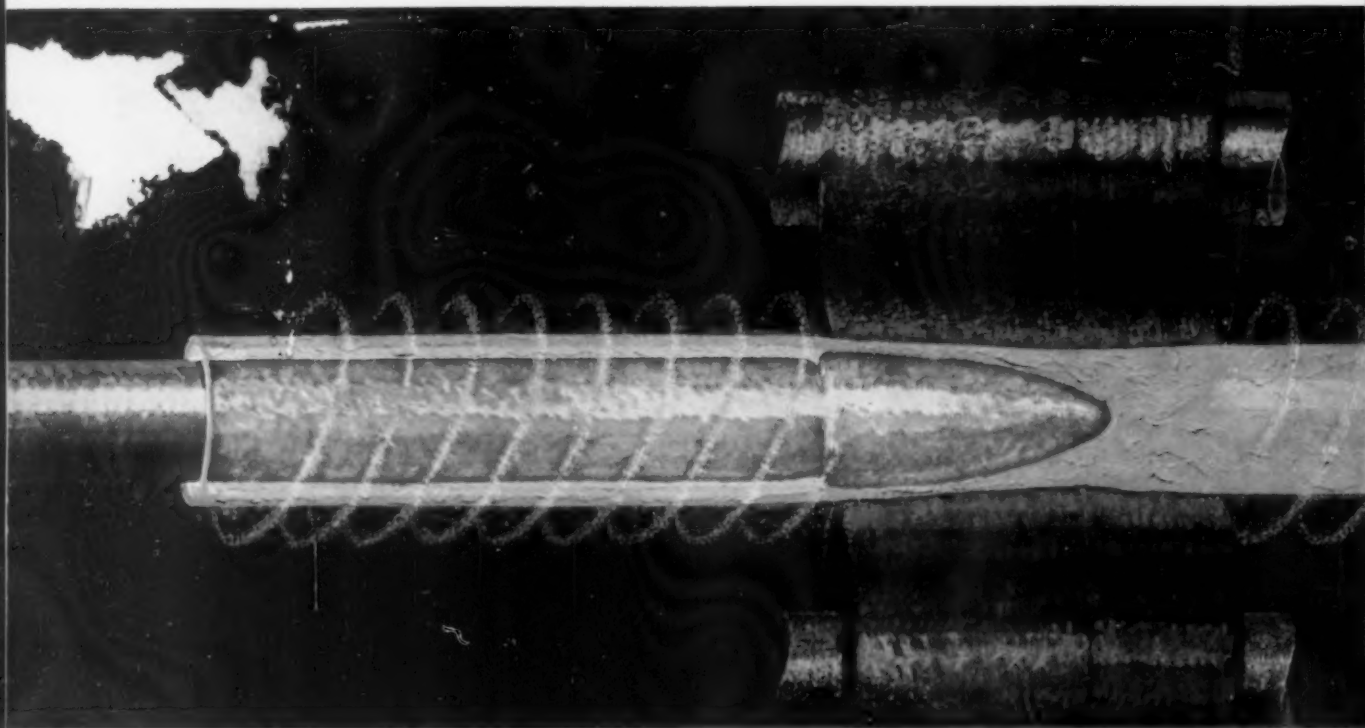
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# VALVES



*Available From Leading Distributors Everywhere*

# What a tough way to come into the world!



The piercing operation is one of the first steps in creating seamless tubing from a solid section of steel. After we set the hot steel billet in place, we ram it. Spin it. Push its insides out. And stretch it into a tube many times longer than the original piece of steel.

Consider the grueling way USS National Seamless Alloy Pressure Tubes are made and all the rigid tests they have to pass before we'll ship. You can see why they are the strongest, safest tubes you can buy. Contact your National Tube Distributor for USS National Seamless Pressure Tubes. *USS and National are registered trademarks*



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a product is made of  
modern, dependable Steel.



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